FURUNO

OPERATOR'S MANUAL

HIGH SPEED DATA MODEM

MODEL IB-681

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

© **FURUNO ELECTRIC CO., LTD.**

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•Your Local Agent/Dealer

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(TENI)

00080858900

⚠ SAFETY INSTRUCTIONS

Safety Information for the Operator

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

Immediately turn off the power at the switchboard if water leaks into the equipment or something is dropped in the equipment.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

⚠ WARNING

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Make sure no rain or water splash leaks into the equipment.

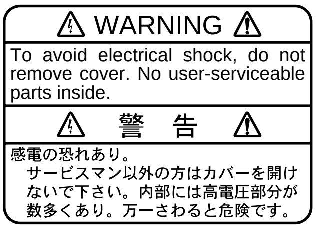
Fire or electrical shock can result if water leaks in the equipment.

Keep heater away from equipment.

A heater can melt the equipment's power cord, which can cause fire or electrical shock.

⚠ CAUTION

A warning label is attached to the equipment. Do not remove the label. If the label is missing or illegible, contact a FURUNO agent or dealer.



⚠ WARNING ⚠

To avoid electrical shock, do not remove cover. No user-serviceable parts inside.

⚠ 警 告 ⚠

感電の恐れあり。
サービスマン以外の方はカバーを開けないで下さい。内部には高電圧部分が数多くあり。万一さわると危険です。

Name: Warning Label (1)
Type: 86-003-1011-0
Code No.: 100-236-230

Safety Information for the Installer

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result if the power is left on.

Do not install the equipment where it may get wet from rain or water splash.

Water in the equipment can result in fire, electrical shock or equipment damage.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage. The voltage rating of the equipment appears on the label above the power connector.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass:

	Standard Compass	Steering Compass
HSD Modem	1.2 m	0.9 m

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Declaration of conformity to type

INTRODUCTION

FURUNO Electric Company thanks you for selecting the IB-681 High Speed Data (HSD) Modem. We are confident you will discover why FURUNO has become synonymous with quality and reliability.

For over 50 years FURUNO Electric Company has enjoyed an enviable reputation for excellent marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

The IB-681 is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly installed and maintained. Please carefully read and follow the recommended procedures for installation, operation and maintenance to get maximum performance from this equipment.

Features

The IB-681 provides global, satellite-based high speed duplex 56 or 64 Kbps data via ISDN. High speed data services will be useful to companies and organizations with large amounts of data to transmit.

- Automatic, manual calling
- LEDs show equipment status
- Simple operation
- DIP switches and data rate switch set operation parameters

Notice

FURUNO will assume no responsibility for security-related problems.

Network configuration depends on application, number of terminals used, shipboard network and land network. Generally, setup is done on the user's equipment. For details on network setup contact the network manager.

EQUIPMENT LIST

Complete Set

Name	Type	Code No.	Qty	Remarks	
HSD Modem Unit	IB-681		1		
Installation Materials	CP16-01600	000-043-362	Select one	For FELCOM 81 comm. unit manufactured 7/98 and after CP16-01601 (004-443-480) CP16-01602 (004-442-900) CP16-01605 (004-442-950)	See installation materials lists below for details.
	CP16-01610	000-043-361		For FELCOM 81 comm. unit manufactured before 7/98 CP16-01601 (004-443-480) CP16-01602 (004-442-900) CP16-01603 (004-443-460) CP16-01605 (004-442-950)	

Installation Materials CP16-01601

Name	Type	Code No.	Qty
Connector	17JE-23250-02 (D8C)	000-120-946	2
Connector	17JE-23370-02 (D8C)	000-141-104	2
Connector Assy.	16S0277-0	000-141-465	1
Cable Assy.	BNC-P-55UX2-1000	000-141-513	3
Cable Assy.	17JE-573-2 Harness	000-141-514	1
Copper Strap	05-003-0031	590-300-310	1
Tapping Screw	6X20 SUS 304	000-802-084	4

Installation Materials CP16-01602

Name	Type	Code No.	Qty
Connector Assy.	CP16-01606	004-442-910	1
Cable Assy.	PH5P-L200-SMP2P	000-141-558	1
Cable Assy.	PH2P-L300-SMR2P	000-141-559	1
Panhead Screw	M4X8	000-881-445	4

Installation Materials CP16-01603

Name	Type	Code No.	Qty
RF CONV Board	16P0130	004-441-140	1
Rear Panel	16-011-2013-5	100-245-695	1

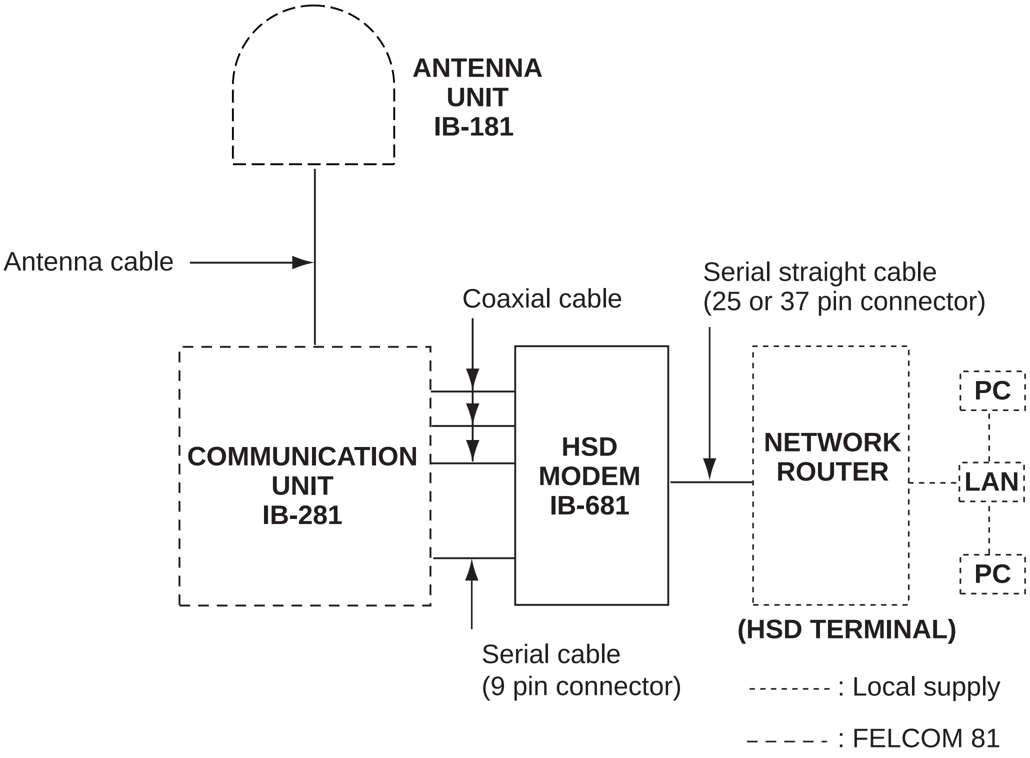
Installation Materials CP16-01605

Name	Type	Code No.	Qty
Programmed ROM	PROM16501051	004-441-500	1
Programmed ROM	PROM16501061	004-441-510	1

Optional Equipment

Name	Type	Code No.	Qty	Remarks
Connection Cable Kit	CP16-19	004-447-110	1	17JE-573-2 Harness (000-127-108), BNC-P-55UX2-500 (000-141-969), for extension by 5 m

SYSTEM CONFIGURATION


ANTENNA
UNIT
IB-181
Antenna cable
Coaxial cable
Serial straight cable
(25 or 37 pin connector)
COMMUNICATION
UNIT
IB-281
HSD
MODEM
IB-681
NETWORK
ROUTER
PC
LAN
PC
(HSD TERMINAL)
Serial cable
(9 pin connector)
- - - - - - - - : Local supply
– – – – - : FELCOM 81

1. OVERVIEW

1.1 Control Description

1.1.1 Front panel

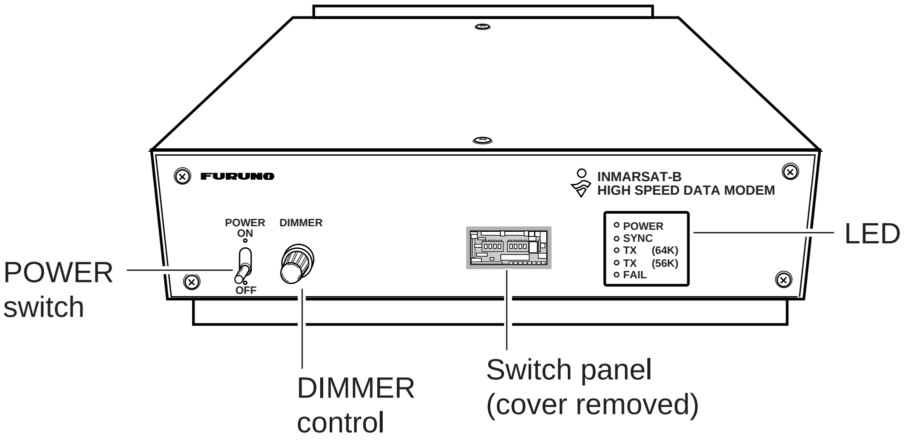

FURUNO
INMARSAT-B
HIGH SPEED DATA MODEM
POWER
ON
OFF
DIMMER
POWER
SYNC
TX (64K)
TX (56K)
FAIL
LED
POWER switch
DIMMER control
Switch panel (cover removed)

Figure 1 IB-681, front view

POWER switch: Turns the power on/off. Flip up to turn the power on; flip down to turn the power off. After turning on the power, all status LEDs light for about 20 seconds. Then all LEDs except POWER go off about 10 seconds later. Turn on the IB-281 about 30 seconds after turning on the IB-681, otherwise the IB-281 may display “HSD Fault.” If the FAIL lamp on the IB-281 goes off then operation is normal.

DIMMER control: Adjusts the illumination of the status LEDs.

Switch panel: Contains eight DIP switches and the Data Rate switch which set operation parameters. See page 3 for details.

Status LEDs: Show equipment status.

POWER: Lights when the power is turned on.
SYNC: Lights, during HSD communications, when satellite signal becomes synchronized.
TX (64K): Lights when data rate is 64 Kbps.
TX (56K): Lights when data rate is 56 Kbps.
FAIL: Lights for communication error.

Note: TX LED on IB-281 dose not light during HSD communications.

1.1.2 Rear panel

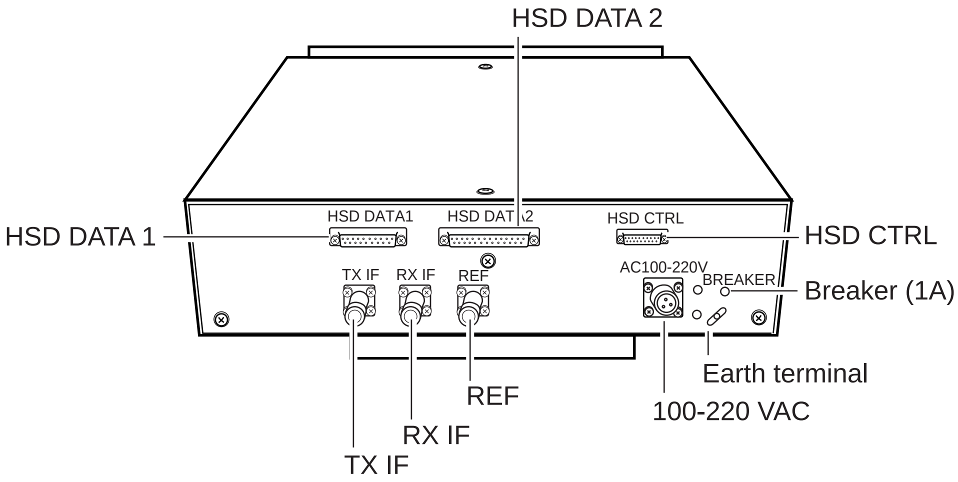

HSD DATA 2
HSD DATA 1
HSD DATA1
HSD DATA2
HSD CTRL
HSD CTRL
TX IF
RX IF
REF
AC100-220V
BREAKER
Breaker (1A)
Earth terminal
REF
100-220 VAC
RX IF
TX IF

Figure 2 IB-681, rear view

HSD DATA 1: RS-232 interface connector

HSD DATA 2: RS-449 interface connector

HSD CTRL: Conducts control data communications between communication unit and HSD modem.

Breaker: The red button pops out when overcurrent flows inside the equipment. In this case, find the cause of the overcurrent and push the button.

100-220 VAC: Connection of 100/220 VAC power.

REF: Receives reference signal from the communication unit.

RX IF: Receives IF signal from the communication unit.

TX IF: Sends IF signal to the communication unit.

2. SETTINGS

2.1 Switch Panel Settings

Communication parameters are set with the switches in the switch panel. Unfasten two screws to access the switches. Note that it is not necessary to turn off the IB-681 to access the switches.

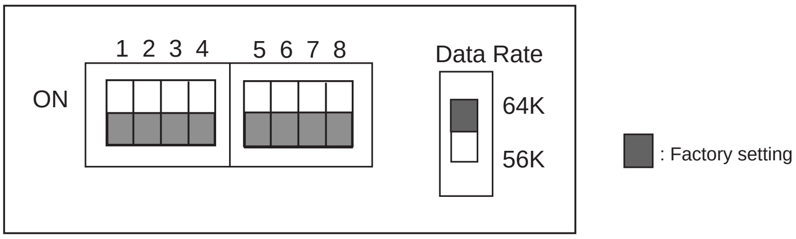


Figure 3 Switch panel

2.1.1 Data rate

Set the data rate according to land line/network. The default setting is 64k (64 Kbps). 56k is for USA ISDN circuit, for example. Data rate cannot be change after connecting with a subscriber.

2.1.2 DIP switches

Table 1 DIP switch functions

SW No.	Function	OFF	ON
SW1	Automatic call	Direct call	Address call
SW2	Terminal interface	RS-449	RS-232
SW3	Automatic data rate switching	NO	YES
SW4	Command format	HDLC	BSC
SW5	Character format	8 bit/no parity	7 bit/odd parity
SW6	Not used		
SW7	Not used		
SW8	Not used		

SW1: Automatic call mode

OFF: Call starts with reception of DTR signal from HSD terminal.
ON: Call starts when subscriber number from the HSD terminal is loaded on the TxD line.

SW2: Terminal interface

Interface with HSD terminal.

OFF: RS-449 (D-SUB 37 pin connector).
ON: RS-232 (D-SUB 25 pin connector).

SW3: Automatic data rate switching

Determines whether to receive data at data rate other than what is set with the Data Rate switch in the switch panel.

OFF: Prevents reception of data received at data rate other than which is set with the data rate switch.
ON: Enables reception of data received at data rate other than which is set with the data rate switch.

SW4: Command format

Sets command format to the HSD modem, and is only effective when SW1 is set for address call (ON). Set according to specification of HSD terminal.

OFF: HDLC format
ON: BSC format

HDLC command format

	Flag	Addr	Control	Command/Indication	FCS	Flag

	b0 b1 · · · · · b7
Flag: Flag	0 1 1 1 1 1 1 0
Address: Address Field	1 1 1 1 1 1 1 1
Control: Control Field	1 1 0 0 1 0 0 0
FCS: Frame Check Sequence	

Parity added only to command, indication. (b0) sent first along signal wire.

BSC command format

	SYN	SYN	SYN	STX	Command, Indication	ETX	

SYN: 16H
STX: 02H
ETX: 03H

Three SYN sent from HSD terminal to HSD modem. However, only two SYN are necessary between the HSD modem and the HSD terminal.

Parity is also added to these control characters. LSB is first sent along the signal line.

SW5: Character format

Sets character format to the HSD modem, and is only effective when SW1 is set for address call (ON). Set according to specification of HSD terminal.

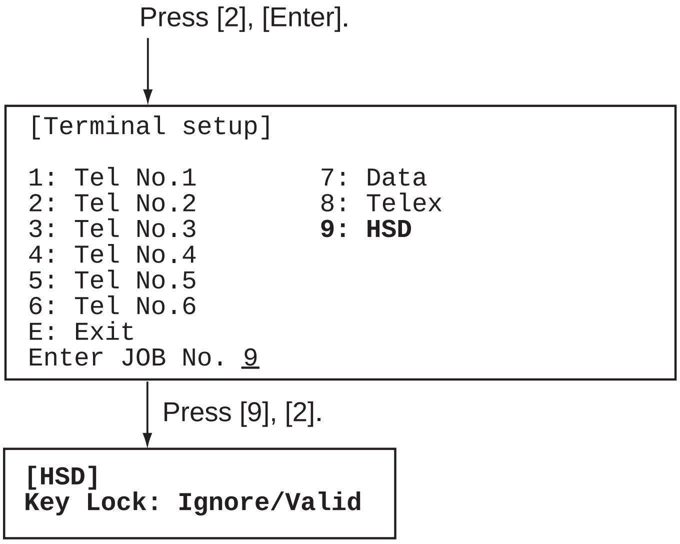
OFF: 8 bit, no parity
ON: 7 bit, even, odd parity

2.2 OID/DID and IMN Settings

OID/DID and IMN are set on the communication unit, usually at the time of installation. The telephone for HSD calling is alos set by the installing technician. For more information, contact a FURUNO dealer or agent.

2.3 Terminal Unit Settings

“9: HSD” is added to the Terminal Setup menu on the terminal unit. Additionally, the HSD is provided with the lock switch function, which you may set it as shown below.



Press [2], [Enter].

```
[Terminal setup]

1: Tel No.1          7: Data
2: Tel No.2          8: Telex
3: Tel No.3          9: HSD
4: Tel No.4
5: Tel No.5
6: Tel No.6
E: Exit
Enter JOB No. 9
```

Press [9], [2].

```
[HSD]
Key Lock: Ignore/Valid
```

Ignore:	Lock switch setting ignored; receive capability.
Valid:	Lock switch setting followed; cannot transmit when lock switch is in "disable" position.

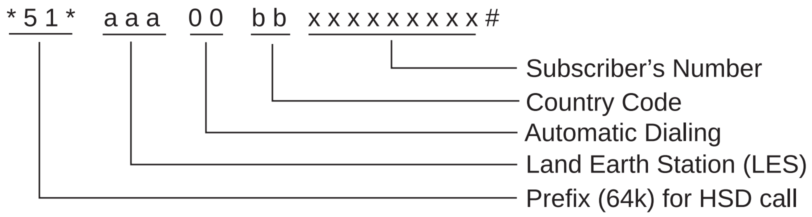
Figure 4 Terminal setup menu

2.4 Registering, Deleting Subscriber Number

2.4.1 Registering subscriber number

Register subscriber number as follows with the No.1 telephone. The subscriber number may contain 20 digits (*, # cannot be registered). The number can be confirmed by printing the status display.

1. Pick up the handset of the No.1 telephone and confirm dial tone.
2. Dial subscriber’s no. as follows:


51 aaa 00 bb xxxxxxxxx#
Subscriber’s Number
Country Code
Automatic Dialing
Land Earth Station (LES)
Prefix (64k) for HSD call

3. Confirm dial tone (See table 2).

2.4.2 Deleting subscriber number

1. Dial * 5 1 * #.

2.4.3 Confirming subscriber number

HSD communications settings (HSD settings input to the communcation unit) are contained on the status monitor which can be printed from the No.1 telephone.

1. Pick up the handset of the No. 1 telephone.
2. Dial * 9 6 # to print the status monitor.

```
.
.
.
Prefix Code:
HSD Destination: XXXXXXXXXXXXXXX
```

2.4.4 Status display on the terminal unit

The status display shows HSD state. You can print it from the terminal unit. Sample HSD status indications are as below.

RX Signal Level (HSD) ...
RX IF AGC Level (HSD) ...
2nd Local (HSD) ...

3. OPERATION

3.1 Calling

An HSD call may be made automatically or manually.

3.1.1 Automatic HSD call

All automatic HSD calls are carried and terminated from the HSD terminal. Automatic HSD calls begin when the DTE raises the DTR line in the serial connector. The Inmarsat terminal dials the pre-programmed number. Upon answer by the called system the HSD port is enabled and data transfer can take place.

Automatic HSD calls fall into two categories: direct call and address call. The category may be selected with DIP switch SW1: turn off the switch (default setting) for direct call; turn on the switch for address call. See page 3 for DIP switch setting.

Direct call setup

- Program subscriber number. See page 5.
- Turn off DIP switch SW1.

The subscriber is called when the HSD terminal turns on the DTR signal.

Address call setup

- See page 13 for sequence.
- Turn on DIP switch SW1.

The HSD terminal must support address calls. The HSD terminal outputs the following command to the HSD modem in the format set by DIP switch SW4 and SW5:

CRN x x x x x (V.25bis command; x x x x x = subscriber number)

For further details about the CRN command, see page 10.

Note : If personal computer cannot call by user’s application having V.25 bis terminal interface, call by DTR dailing (Direct call).

Clearing automatic HSD call

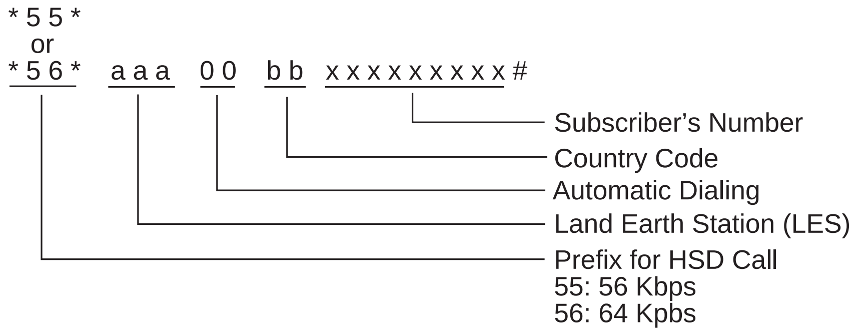
An automatic HSD call is cleared when the DTR signal is received from the HSD terminal.

The HSD terminal turns off DTR, then the automatic call is cleared.
HSD terminal sends clear signal to CES, then the HSD modem turns off DCD and CTS.
Finally, the HSD modem turns off DSR.

3.1.2 Manual call

Manual calls are made with a telephone (designated at installation) connected to the communication unit. The HSD terminal must support manual calls.

To make a manual call, turn off DIP switch SW1, and then dial subscriber number as follows:


* 5 5 *
or
* 5 6 *
a a a
0 0
b b
x x x x x x x x x #
Subscriber's Number
Country Code
Automatic Dialing
Land Earth Station (LES)
Prefix for HSD Call
55: 56 Kbps
56: 64 Kpbs

Upon answer by the called system the HSD port is enabled and data transfer can take place. After the number is dialed listen for progress tone to confirm call. See the table below. When you hear the “HSD call successful” tone hang up the handset.

Table 2 Progress tones

Tone Name	Frequency	ON, OFF Interval
HSD call successful	600 Hz	1 sec, 0.5 sec
HSD call failure	425 Hz	0.5 sec, 0.5 sec
Manual HSD call cleared/called no. accepted	425 Hz	1 sec, 0.5 sec
Manual HSD call cleared/called no. not accepted	425 Hz	0.5 sec, 0.5 sec

Clearing manual call

Dial * 5 9 #.

3.2 Receiving

Certain HSD terminals cannot receive the RI signal and therefore cannot receive.

3.2.1 Automatic call mode and receiving operation

Receiving processing depends on the setting of DIP switch SW1 as follows:

SW1 State	Remarks
OFF (direct call)	The HSD terminal uses the DTR signal to reply. To do this the HSD terminal keeps the DTR signal OFF when it is not communicating. When a call arrives, the HSD modem turns on the RI signal, the HSD terminal detects the RI signal and then turns on the DTR signal. Then, the HSD modem turns off RI and then turns on DSR, CTS, DCD to communicate over land line.
ON (address call)	The HSD terminal does not reply to an address call with the DTR signal; the DTR signal is used to show if the HSD terminal can send control commands to the HSD modem. When a call arrives, the method by which the HSD terminal replies depends on DTR status as below.

Address call and DTR ON

When a call arrives, the HSD modem turns RI ON and then acknowledges reception by sending INC to the HSD terminal. (See page 10.) Five seconds after sending INC receiving processing is initiated. When processing is completed, RI goes OFF and DSR, CTS, DCD go ON to communicate over land line.

If the HSD terminal sends the DIC command to the HSD modem, the HSD modem does not initiate receiving processing. This happens in the following instances:

- Overlapping calls (receiving processing cancelled)
- Processing initiated within five seconds after INC is received

If this occurs while the call is being relayed, the CIC command is sent and the HSD modem reinitiates processing.

Address call and DTR OFF

When a call arrives, the HSD modem turns RI ON. This tells the HSD terminal to turn on the DTR signal, which causes the HSD modem to send the INC (indication) signal to the HSD terminal to indicate it is receiving. The HSD terminal then sends the CIC command to the HSD modem which initiates receiving processing. When processing is completed, RI goes OFF and DSR, CTS, DCD go ON to communicate over land line.

When DIC is sent by the HSD terminal instead of CIC, the HSD modem sends the indication VAL. In this case processing is not started. Furthermore, when the CRN command or other three-character command is sent the HSD modem sends the indication INV.

3.2.2 Receiving and automatic data rate switching

A call arrives at the data rate set on a subscriber’s equipment, and the setting of DIP Switch SW3 determines if the call will be received or not when the data rate is different from that set on the IB-681.

SW3 State	Remarks
OFF: No automatic data rate switching	HSD call not accepted when its data rate is different from that set on the IB-681. Use this setting when the synchro clock to the HSD terminal cannot automatically be changed to match data rate.
ON: Automatic data rate switching	HSD call accepted regardless of data rate. For example, if the Rate switch is set to 64 K and a call's rate is 56 K, the call is transmitted at 56 K. The synchro clock signal to the HSD terminal is also automatically changed to 56 K. **Note:** The HSD terminal is required to automatically synchronize to varied clock signal.

3.3 V.25bis Command, Indication

For automatic calling, the HSD terminal directs the HSD modem with commands. Additionally the HSD modem directs the HSD terminal with indications. These commands and indications are as below.

Commands

Command	Name	Description
CRNxx · · x	Call Request Number	Transmit a call
DIC	Disable Incoming Call	Prevents automatic reply.
CIC	Connect Incoming Call	Allows automatic reply.

Consecutive commands cannot be accepted. Commands use IA5 characters. Upper case or lower case may be input, but case cannot be mixed.

Indications

Indication	Name	Description
INC	Incoming Call	Call has arrived.
INV	Invalid	Error in command from terminal.
VAL	Valid	Accept command from terminal.
CFIxx	Call Failed	"Call failed reply" (and reason) in response to CRN

Indications are done with IA5 characters, in upper case only.

Command description

Command	Description
CRNxx · · x	Subscriber number specified and called. xx · · x Subscriber number (20 digits max.) Useable characters: "0-9", " " (space), "-", "#" " " and "-" can be used to separate digits for clarity; they are not recognized as part of subscriber's number. "#" is recognized as end code (input is not mandatory). " ", "-" and "#" are not sent to CU. Examples: CRN0030081123456789 (Subscriber's number is 003081123456789) CRN0030081-12-345-6789 (Same number as above except "-" inserted for clarity) CRN0030081 12-345-6789# (Same number as first number above except " ", "-" inserted for clarity and " #" inserted to show end of number)
DIC	Prevents automatic reply to received calls.
CIC	Allows automatic reply to received calls.

Indication description

Indication	Description
INC	Informs DTE of incoming call
INV	Informs of invalid command from terminal.
VAL	Informs of valid command from terminal.
CFIxx	Informs of "Call failed reply" in response to CRN command. xx (reason) ET: Subscriber is busy. CB: Telephone/fax busy (CU is busy). RT: Subscriber's DTE is not answering (subscriber not connected). AB: Subscriber not replying ("Scr Vec Ack" not received).

3.4 Call Sequence

3.4.1 Direct call setup sequence

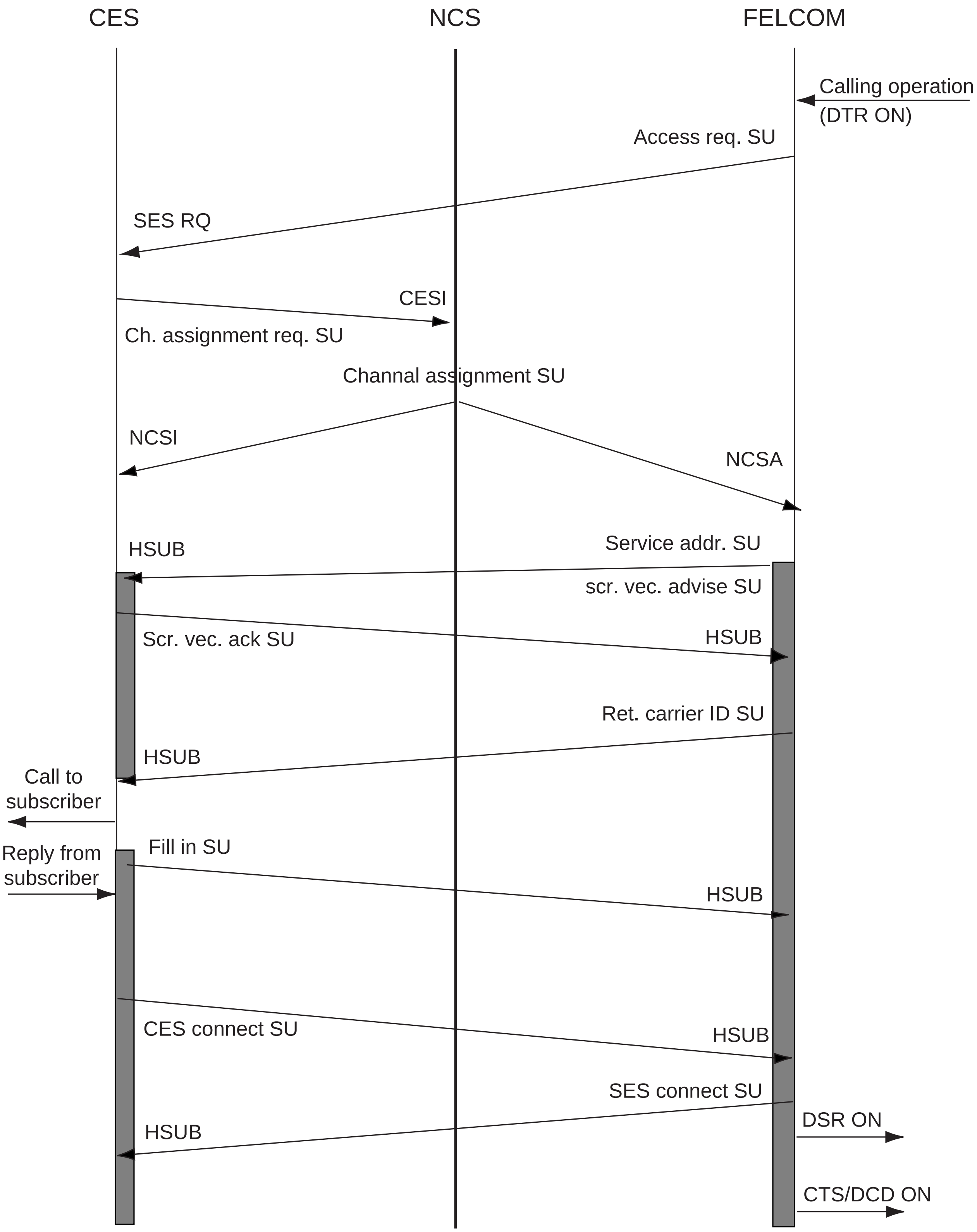

CES
NCS
FELCOM
Calling operation
(DTR ON)
Access req. SU
SES RQ
CESI
Ch. assignment req. SU
Channal assignment SU
NCSI
NCSA
HSUB
Service addr. SU
scr. vec. advise SU
Scr. vec. ack SU
HSUB
Ret. carrier ID SU
HSUB
Call to
subscriber
Reply from
subscriber
Fill in SU
HSUB
CES connect SU
HSUB
SES connect SU
HSUB
DSR ON
CTS/DCD ON

Figure 5 Direct call setup sequence

3.4.2 Address call setup sequence

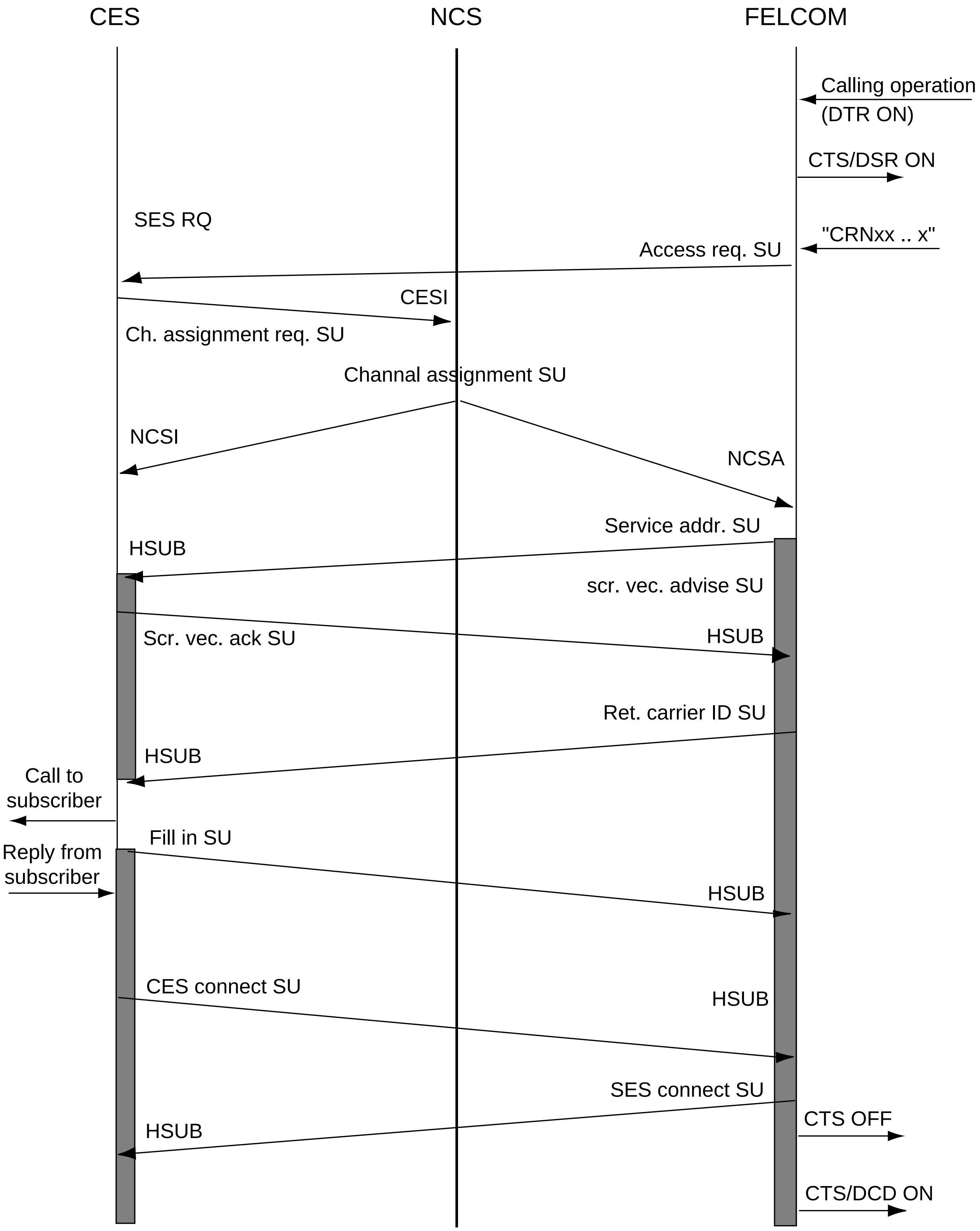

CES
NCS
FELCOM
Calling operation
(DTR ON)
CTS/DSR ON
SES RQ
"CRNxx .. x"
Access req. SU
CESI
Ch. assignment req. SU
Channal assignment SU
NCSI
NCSA
Service addr. SU
HSUB
scr. vec. advise SU
Scr. vec. ack SU
HSUB
Ret. carrier ID SU
HSUB
Call to
subscriber
Fill in SU
Reply from
subscriber
HSUB
CES connect SU
HSUB
SES connect SU
CTS OFF
HSUB
CTS/DCD ON

Figure 6 Address call setup sequence

3.4.3 Manual call setup sequence

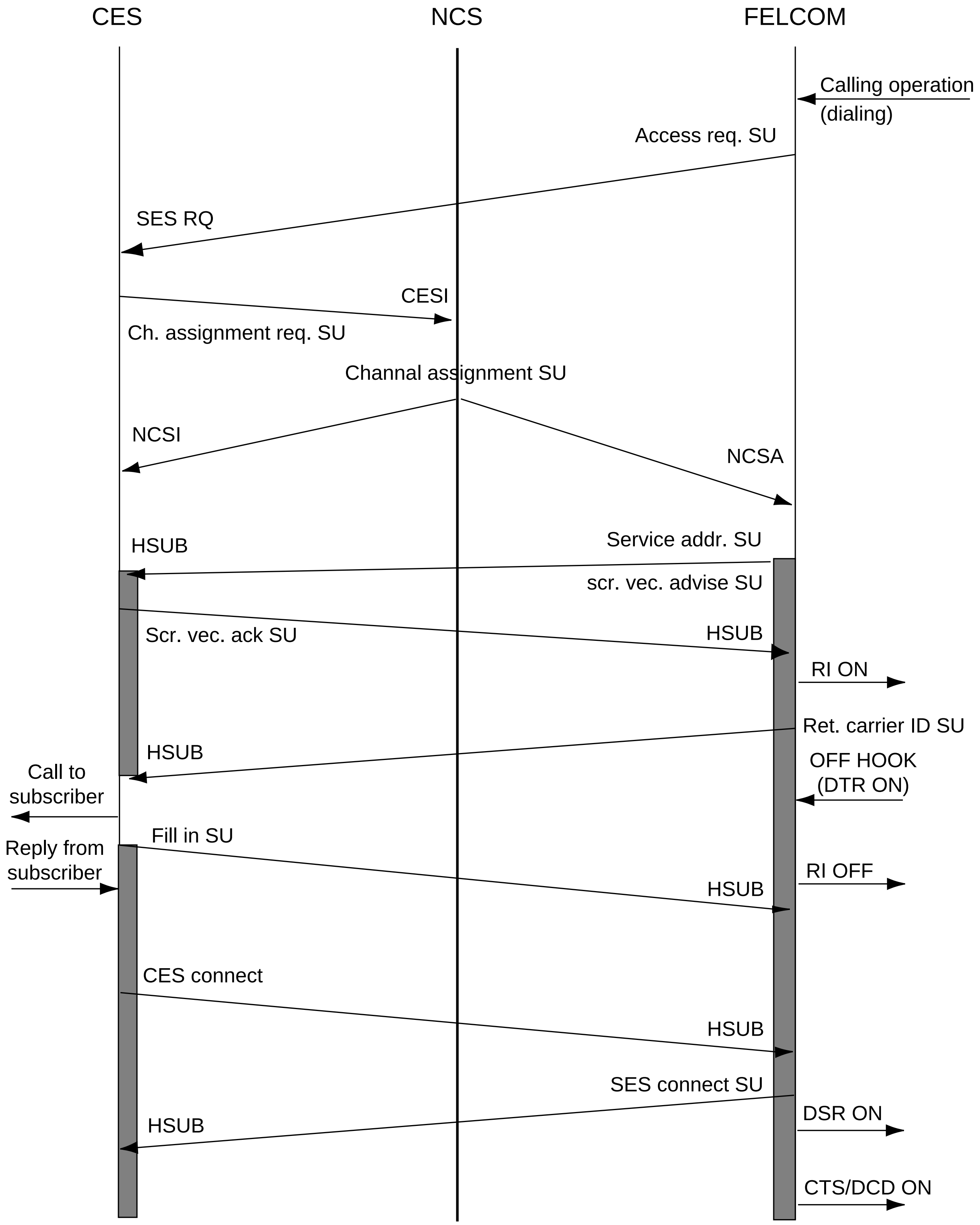

CES
NCS
FELCOM
Calling operation
(dialing)
Access req. SU
SES RQ
CESI
Ch. assignment req. SU
Channal assignment SU
NCSI
NCSA
Service addr. SU
HSUB
scr. vec. advise SU
Scr. vec. ack SU
HSUB
RI ON
Ret. carrier ID SU
HSUB
OFF HOOK
(DTR ON)
Call to
subscriber
Fill in SU
Reply from
subscriber
RI OFF
HSUB
CES connect
HSUB
SES connect SU
DSR ON
HSUB
CTS/DCD ON

Figure 7 Manual call setup sequence

3.4.4 Automatic call clear sequence

An automatic call is cleared when the DTR signal is received from the HSD terminal.

The HSD terminal turns off DTR, then the automatic call is cleared.
The HSD terminal sends clear signal to CES, then HSD modem turns off DCD and CTS. Finally HSD modem turns off DSR.

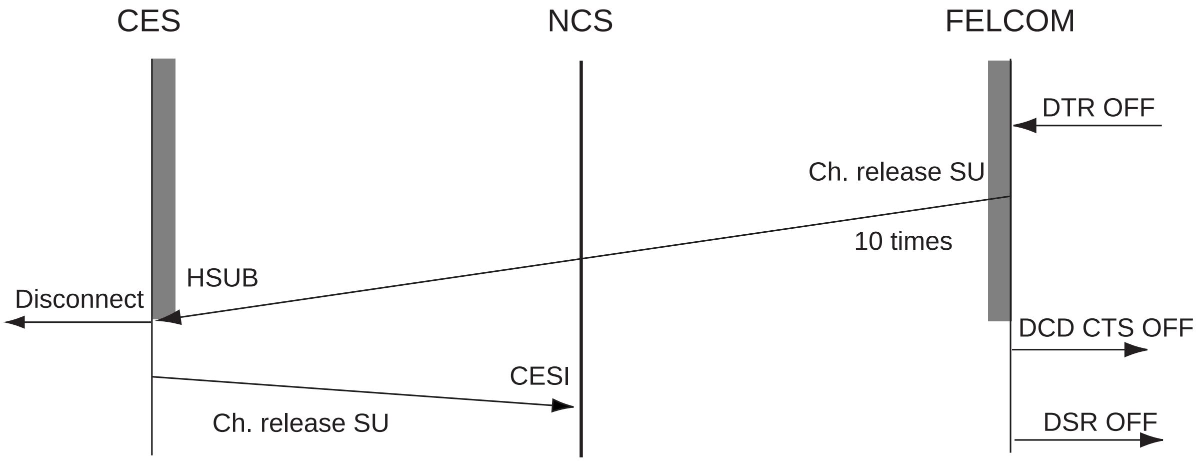

CES
NCS
FELCOM
DTR OFF
Ch. release SU
10 times
HSUB
Disconnect
DCD CTS OFF
CESI
Ch. release SU
DSR OFF

Figure 8 Automatic call clear sequence

3.4.5 Call clear sequence from land

Land clears automatic call, then CES sends clear signal. The HSD modem turns off DCD and CTS. Finally, the HSD modem turns off DSR, and the HSD terminal turns off DTR.

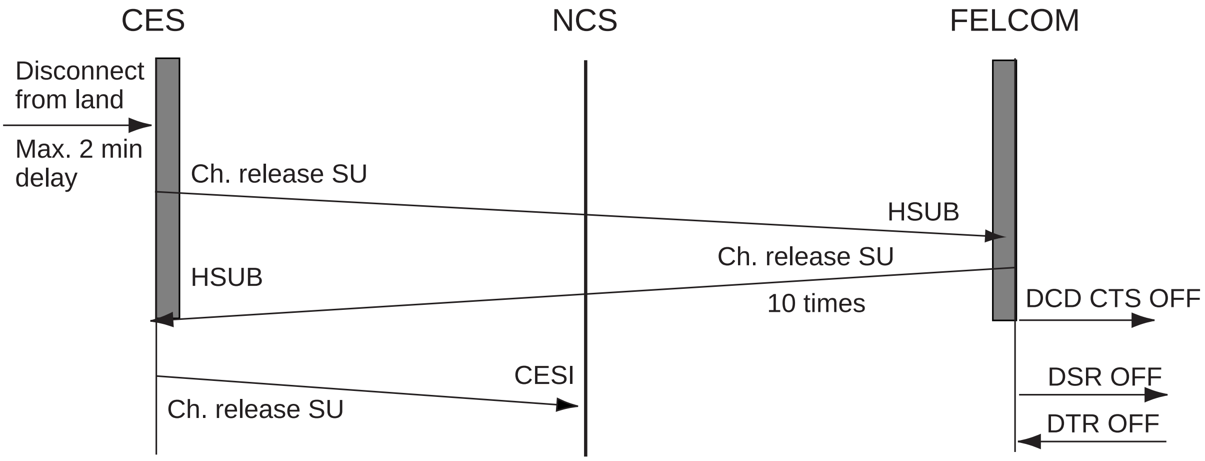

CES
NCS
FELCOM
Disconnect from land
Max. 2 min delay
Ch. release SU
HSUB
Ch. release SU
HSUB
10 times
DCD CTS OFF
CESI
Ch. release SU
DSR OFF
DTR OFF

Figure 9 Call clear sequence from land

3.4.6 Manual call clear sequence

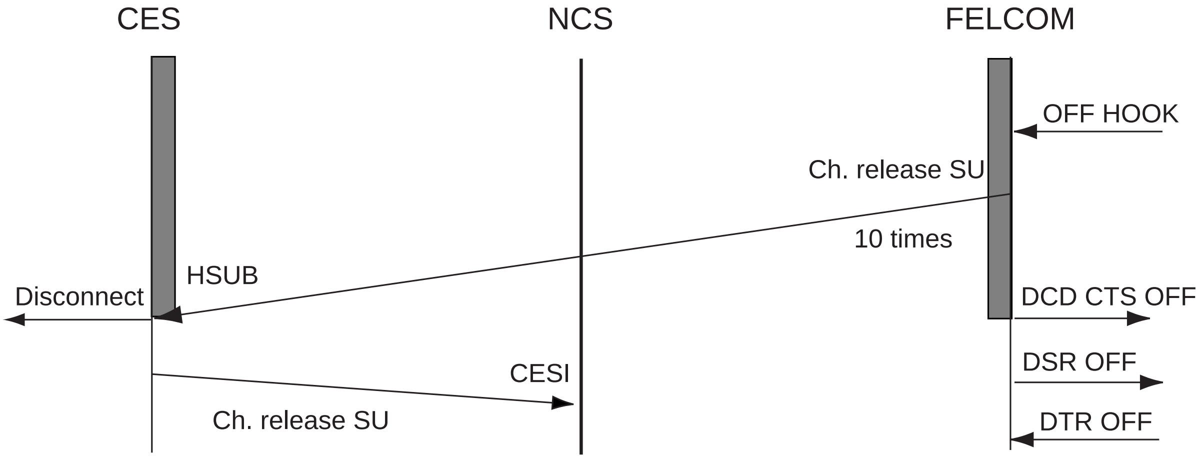

CES
NCS
FELCOM
OFF HOOK
Ch. release SU
10 times
HSUB
Disconnect
DCD CTS OFF
DSR OFF
CESI
Ch. release SU
DTR OFF

Figure 10 Manual call clear sequence

4. MAINTENANCE & TROUBLESHOOTING

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

4.1 Maintenance

4.1.1 Cleaning

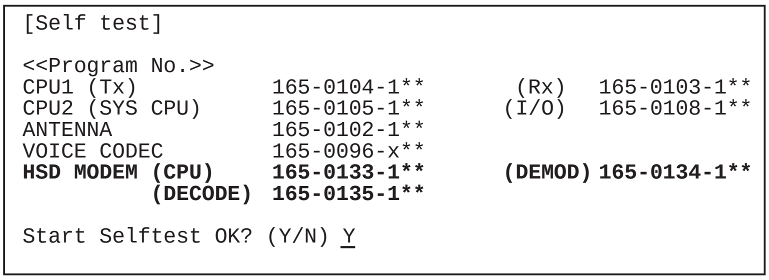
Dust or dirt on the equipment may be removed with a soft, dry cloth. Do not use commercial or chemical cleaners to clean the unit; they can remove paint and markings.

4.1.2 Resetting the circuit breaker

The BREAKER button on the rear panel pops out when the voltage input to the equipment exceeds the voltage rating. In this case, reset the power and press the button to restore normal operation.

4.2 Self Test at Terminal Unit

1. At the standby display, press [F4], [6], [5] and [Enter] to display program nos. of devices. If the IB-681 is powered off or is not connected, *CONNECT ERROR* appears in the HSD MODEM field.



```
[Self test]

<<Program No.>>
CPU1 (Tx)           165-0104-1**       (Rx)   165-0103-1**
CPU2 (SYS CPU)      165-0105-1**      (I/O)   165-0108-1**
ANTENNA             165-0102-1**
VOICE CODEC         165-0096-x**
HSD MODEM (CPU)     165-0133-1**      (DEMOD) 165-0134-1**
          (DECODE)  165-0135-1**

Start Selftest OK? (Y/N) Y
```

** Program No.

Figure 11 Program no. display

2. Press [Y] and [Enter] to test.

```
- Test Result -

CPU1        : ROM-OK     RAM-OK      SYNC-OK
              DPRAM-OK               VITERBI-OK
CPU2        : ROM-OK     RAM-OK      EEPROM-OK
              DPRAM-OK
ANTENNA     : ROM-OK     RAM-OK
DEMOD       : OK
VOICE CODEC: OK
HSD MODEM   : CPU-OK     DEMOD-OK    DECODE-OK

<<Press any key>>
```

Figure 12 Self test results

4.3 Troubleshooting for the User

The table below provides simple troubleshooting procedures which the user may follow to restore normal operation.

Table 3 Troubleshooting table

If...	**Then...**
General	
HSD communications not possible	• check satellite line and LES line. • check land line, land line network. • traffic on land network may be heavy. • gateway or server problem on land line. • network protocol cannot pass through line to Inmarsat. • ask subscriber to check his equipment. • check that, in an address call, character format is compatible with HSD terminal and HSD modem. • check HSD terminal for proper setting. • problem may lie with network to which the HSD modem is connected. • check communication unit/antenna (antenna tracking problem, incorrect OID/DID, cabling on HSD modem). • check HSD modem (check that HSD modem is on, check cabling to HSD terminal).
Calling	
Cannot call manually	• check if automatic data rate switching is OFF. (Manual transmission is not possible when the Data Rate switch setting and data rate of received call are different.)
Cannot call automatically	• check that subscriber no. is correct. • subscriber may be busy. Try again later.
Receiving	
Cannot receive	• check if automatic data rate switching is OFF. (Manual transmission is not possible when the Data Rate switch setting and data rate of received call are different.)
HSD terminal does not reply	• check "receive" settings on HSD modem, HSD terminal. • HSD terminal may not support certain connections.

5. INSTALLATION

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

5.1 Mounting

5.1.1 Mounting location

The mounting location should satisfy the following requirements:

- The mounting location should be clean, moderate in temperature and humidity and well ventilated.
- Be sure to leave sufficient space around the unit for maintenance and checking.
- A magnetic compass will be affected if placed to close to the IB-681. Observe the following compass safe distances to prevent deviation of a magnetic compass: Standard compass, 1.2 m, Steering compass, 0.9 m.
- Keep the unit out of direct sunlight because of heat that can build up inside the cabinet.

5.1.2 Mounting procedure

The unit can be mounted on a tabletop. Fix the unit to the chosen location with 6x20 tapping screws (supplied). For added support, used M6 bolts (local supply) instead of the tapping screws.

Note: Do not place the unit atop the terminal unit of the FELCOM 81.

5.2 Wiring

5.2.1 Wiring between HSD modem and router

A serial straight cable with a 25 pin connector (RS-232 interface) or 37 pin connector (RS-449 interface) connects between the IB-681 and HSD terminal (ex. Router) as shown below. The interface to use is selected with DIP switch SW2. For the RS-232 interface, the length of the cable must not exceed 15 meters. If a longer cable is required use the RS-449 interface instead. Only one HSD Terminal (Router) can be connected.

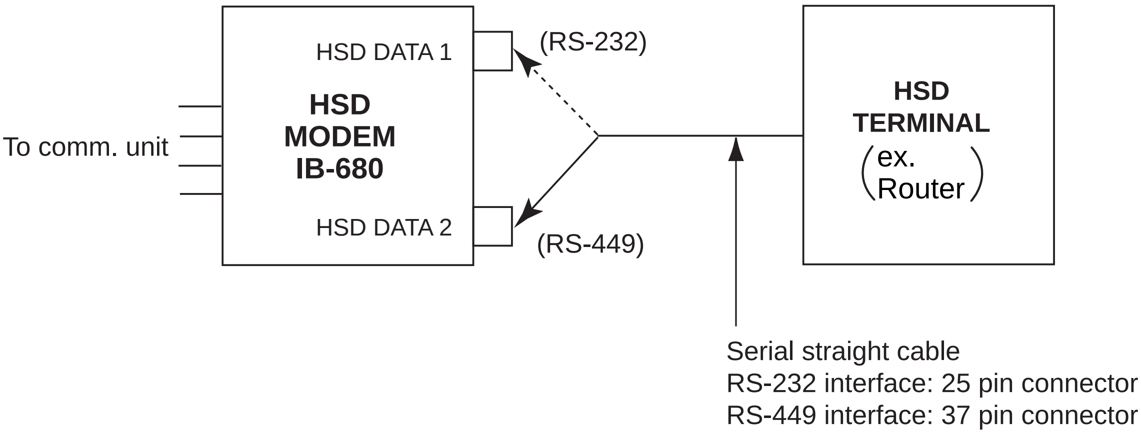
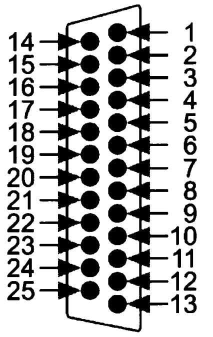

To comm. unit
HSD DATA 1
HSD
MODEM
IB-680
HSD DATA 2
(RS-232)
(RS-449)
HSD
TERMINAL
(ex.
Router)
Serial straight cable
RS-232 interface: 25 pin connector
RS-449 interface: 37 pin connector

Figure 13 Connection of HSD modem and HSD terminal

RS-232 interface description


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Pin (male) arrangement

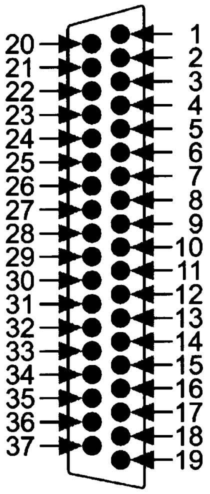
Pin No.	RS-232 Signal	CCITT Circuit	Signal Description	DCE-DTE
2	TD	103	Transmitted Data	←
3	RD	104	Received Data	→
4	RTS	105	Request to Send	←
5	CTS	106	Clear to Send	→
6	DSR	107	Data Set Ready	→
7	SG	102	Signal Ground	–
8	DCD	109	Receive Signal Indicator	→
15	TC	114	Transmit Clock	→
17	RC	115	Receive Clock	→
20	DTR	108	Data Terminal Ready	←
22	RI	125	Ring Indicator	→

Pin nos. 1, 9-14, 16, 18-19, 21, 23-25 are not used.

Figure 14 RS-232 Interface

Note: The HSD modem uses synchronous serial communication, therefore the HSD terminal (PC, etc.) cannot be directly connected unless it has a synchronous serial port.

RS-449 interface description


20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

Pin (male) arrangement

Pin No.	RS-449 Signal	CCITT Circuit	Signal Description	DCE-DTE
4/22	SD	103	Send Data	←
5/23	SCT	114	Send Timing	→
6/24	RD	104	Receive Data	→
7/25	RTS	105	Request to Send	←
8/26	SCR	115	Receive Timing	→
9/27	CTS	106	Clear to Send	→
11/29	DSR	107	Data Set Ready	→
12/30	DTR	108	Data Terminal Ready	←
13/31	DCD	109	Receiver Ready	→
15	IC	125	Incoming Call	→
19	SG	102	Signal Ground	–

Pin nos. 1-3, 10, 14, 16-18, 20-21, 28, 32-37 are not used.

Figure 15 RS-449 Interface

Fabrication of plug case assy.

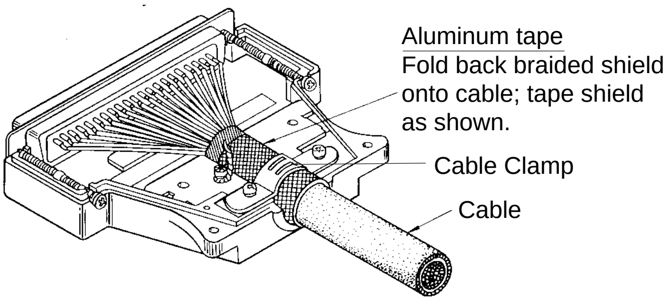

Aluminum tape
Fold back braided shield onto cable; tape shield as shown.
Cable Clamp
Cable

Figure 16 Fabrication of plug case (same procedure for 25 pin, 37 pin)

5.2.2 Modifying the RF CONV board in the communication unit

1. Turn off the communication unit.
2. Detach the cover.
3. Replace the RF CONV Board as follows if it is version -4 or below.
   a) Unfasten the coaxial connector nut.
   b) Unplug all connectors from the RF CONV Board.
   c) Dismount the RF CONV Board.
   d) Mount the new RF CONV Board, plug in connectors to the board, and fasten the coaxial connector nut.
   e) For the new RF CONV Board, set R135 according to antenna cable length as shown in the table below. See Figure 19 for the location of R135.

Antenna cable length	**Position of R135**
10 to 40 m	Marked position (default position)
More than 40 m	Fully clockwise (max. output power)

4. Remove the CPU2 Board from the communication unit. See Figure 19 for location.
5. Replace the ROMs (I/O CPU and SYS CPU) on the CPU2 Board. See Figure 17 for location. Mount the CPU2 Board.

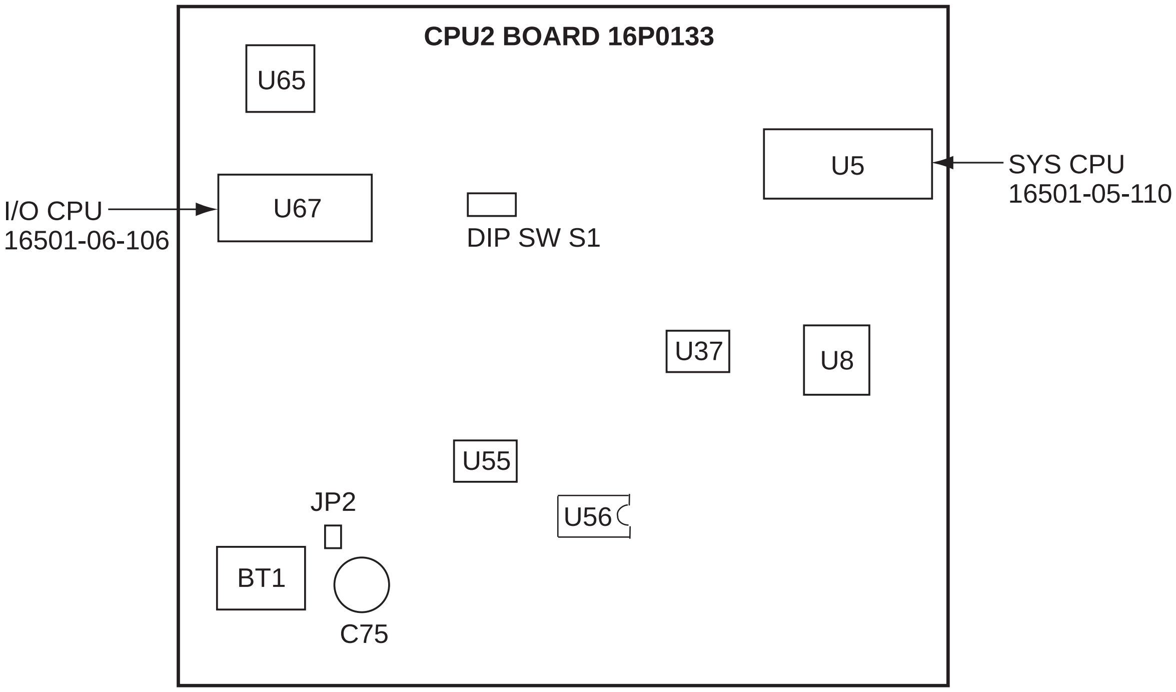

CPU2 BOARD 16P0133
U65
U5
SYS CPU
16501-05-110
I/O CPU
16501-06-106
U67
DIP SW S1
U37
U8
U55
JP2
U56
BT1
C75

Figure 17 CPU2 Board

6. Version -1 of the CPU 2 Board, solder a harness of cable assy. (supplied) to the location shown in the illustration below. Connect other side of cable assy. to J10 on the RF CONV board.

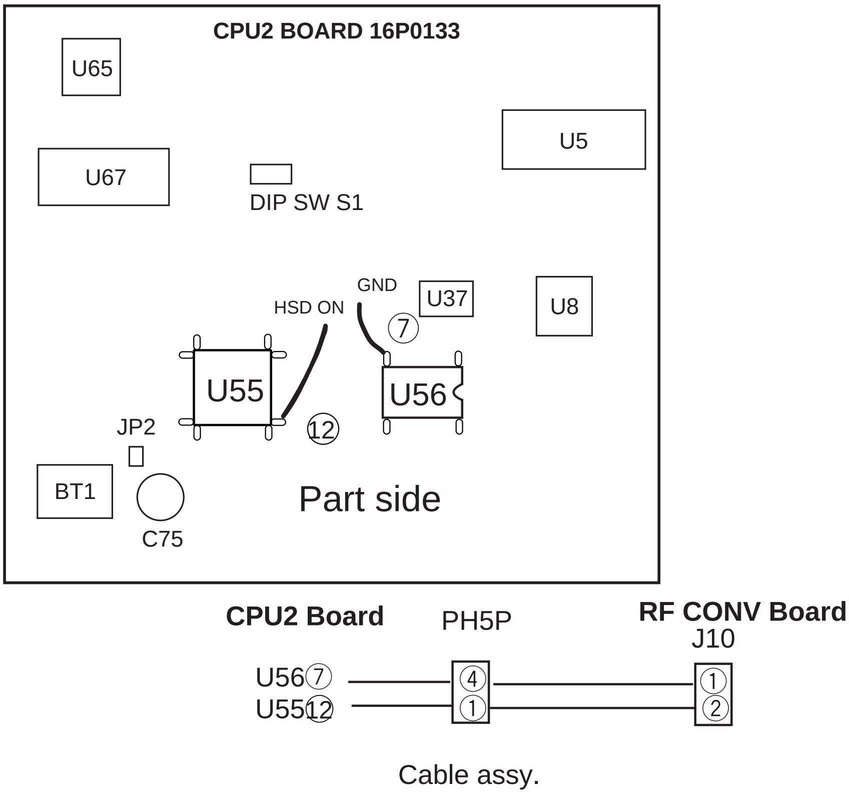

CPU2 BOARD 16P0133
U65
U67
DIP SW S1
U5
GND
HSD ON
U37
⑦
U8
U55
U56
JP2
⑫
BT1
Part side
C75
CPU2 Board
PH5P
RF CONV Board
J10
U56⑦
U55⑫
④
①
①
②
Cable assy.

Figure 18 CPU 2 Board Version 1

7. For version -2 and after of the CPU2 Board, connect the cable assy. (supplied) between J7 on the CPU2 Board and J10 on the RF CONV Board.

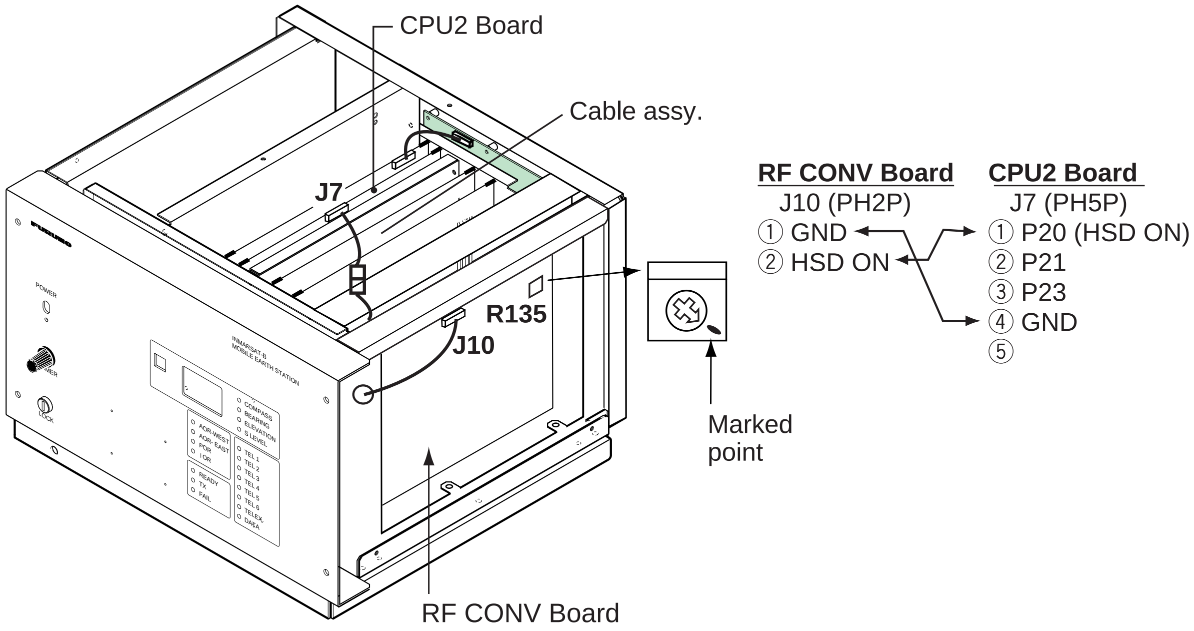

CPU2 Board
Cable assy.
J7
R135
J10
Marked point
RF CONV Board
RF CONV Board
J10 (PH2P)
① GND
② HSD ON
CPU2 Board
J7 (PH5P)
① P20 (HSD ON)
② P21
③ P23
④ GND
⑤

Figure 19 Communication unit, cover removed, right side view

8. Replace the rear panel for the communication unit manufactured before 7/98.

9. Detach all connectors from the rear panel; dismount the power supply unit and the rear panel.

10. For the unit manufactured before 7/98, detach the dummy plate from the rear panel and fasten the connector assy. (supplied) to the rear panel with the screws used to fix the dummy plate. For the unit manufactured after 7/98 use the screws supplied to attach the connector assy. to the rear panel.

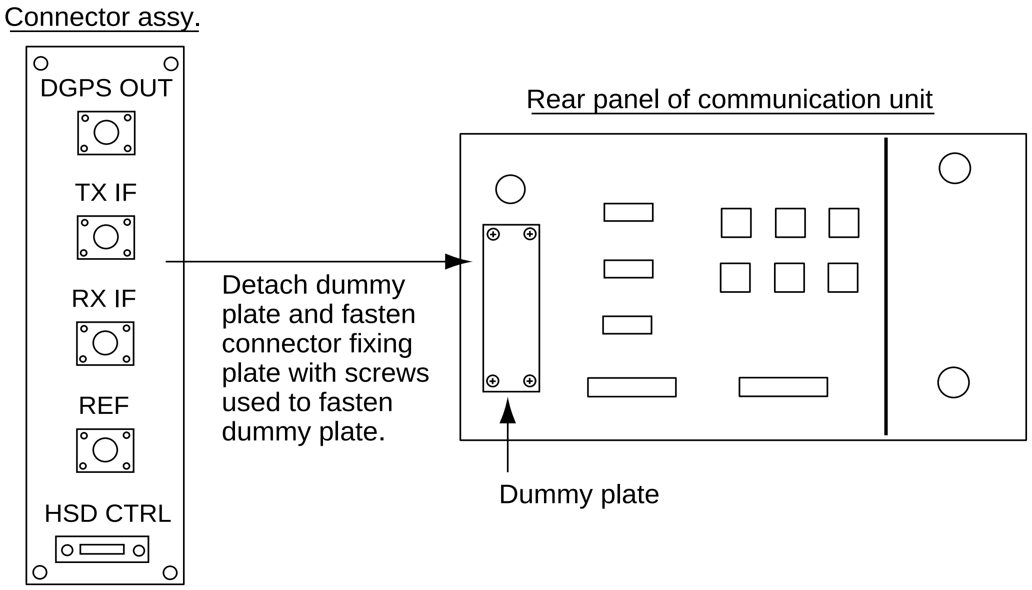

Connector assy.
DGPS OUT
TX IF
RX IF
REF
HSD CTRL
Rear panel of communication unit
Detach dummy plate and fasten connector fixing plate with screws used to fasten dummy plate.
Dummy plate

Figure 20 Mounting of connector assy.

11. For version -2 or higher of the REAR PANEL Board.

    Connect the HSD CTRL connector from the connector assy. to J15 on the REAR PANEL Board.

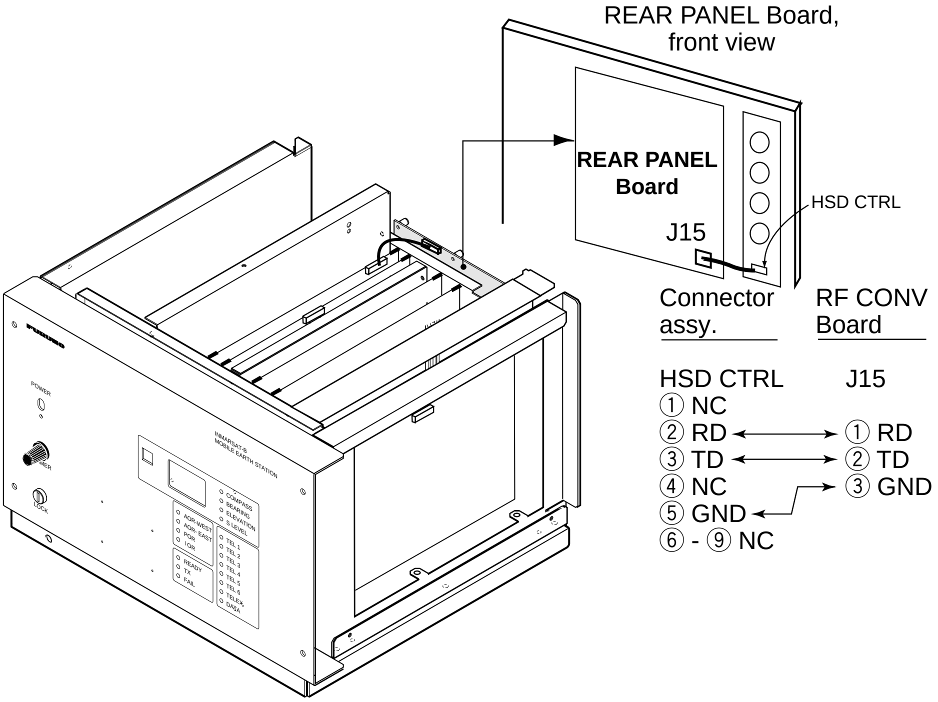

REAR PANEL Board, front view
REAR PANEL Board
J15
HSD CTRL
Connector assy.
RF CONV Board
HSD CTRL
J15
① NC
② RD
① RD
③ TD
② TD
④ NC
③ GND
⑤ GND
⑥ - ⑨ NC

Figure 21 Communication unit, rear view, rear panel removed

For version -1 of the REAR PANEL Board.

Detach the REAR PANEL Board. Solder the HSD CTRL connector to the following points on the REAR PANEL Board.

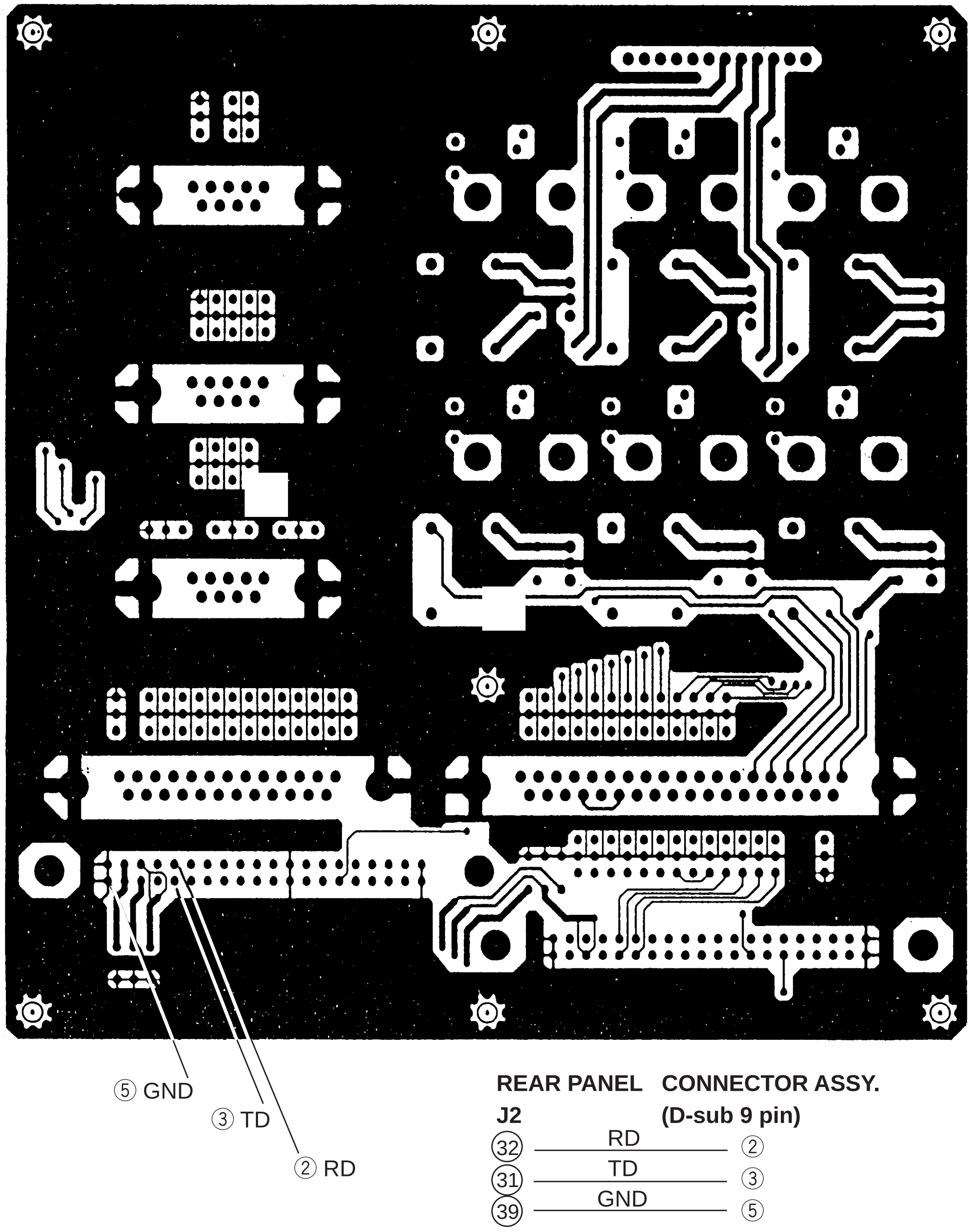
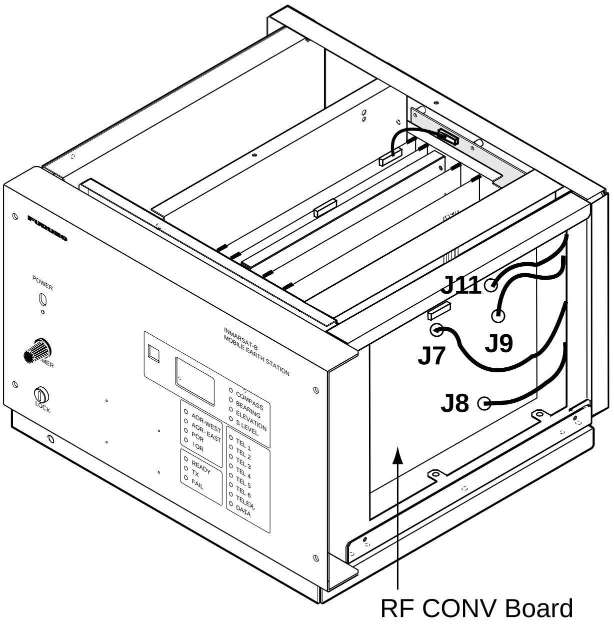

⑤ GND
③ TD
② RD
REAR PANEL
J2
CONNECTOR ASSY.
(D-sub 9 pin)
㉜ RD ②
㉛ TD ③
㊴ GND ⑤

Figure 22 REAR PANEL Board

12. Attach the rear panel and mount the power supply unit.
13. Connect the four plugs from the connector fixing plate to the RF CONV Board as shown in Figure 23.


J11
J9
J7
J8
RF CONV Board

Connector assy.	RF CONV Board
TX IF	J9
RX IF	J7
REF	J8
(DGPS OUT)	(J11)

Figure 23 Communication unit, right side view

14. Attach the cover.
15. Plug in all connectors to the rear panel.

5.2.3 Wiring between HSD modem and communication unit

1. Connect the communication unit to the IB-681 with three coaxial cables (TX IF, RX IF, REF connectors) and one serial cable with 9 pin connector (HSD CTRL connector).

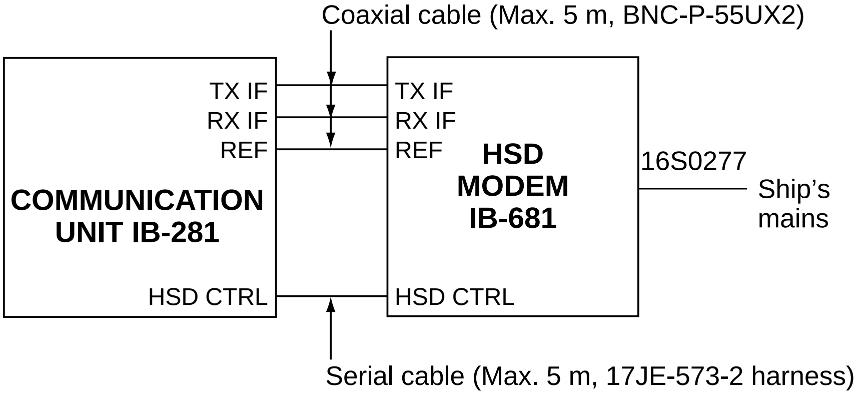

Coaxial cable (Max. 5 m, BNC-P-55UX2)
TX IF
RX IF
REF
COMMUNICATION UNIT IB-281
HSD CTRL
TX IF
RX IF
REF
HSD MODEM IB-681
HSD CTRL
16S0277
Ship's mains
Serial cable (Max. 5 m, 17JE-573-2 harness)

Figure 24 Connection of IB-681 and communication unit

5.2.4 Ground

Connect the copper strap (supplied) between the earth terminal on the IB-681 and ship's superstructure.

⚠ **CAUTION**

Ground the equipment to prevent electrical shock and mutual interference.

APPENDIX Usage Tips

Communication with other makes of Inmarsat-B terminals

HSD communications time may increase depending on communications content when the HSD modem is used in a network. In this case, normal telephone and fax communications are disabled (except distress), thus frequency of communications and communications time must be carefully considered when drawing up communications plans. If communications overlap one another, it may be necessary to install an additional MES.

Landline

Most landlines use ISDN circuits, and rules of operation vary with country. Thus several ISDN terminals may be necessary.

Circuit delay

It takes about 15~20 sesconds for an HSD call to reach land terminal once the call is initialed by an MES.

Propagation delay

A delay of about 15-20 seconds occurs on transmission of file from HSD terminal to coast earth station.
A delay of 240 msec exists on the satellite circuit line between the MES and coast earth station. A 100 msec delay occurs in Tx processing and Rx processing in the IB-681.
Furthermore, a propagation delay may occur on the landline between the land terminal and coast earth station depending on the distance between them.

TCP/IP protocol

- When throughput is slow due to propagation delay, enlarge the size of the TCP window to compensate for the delay. TCP size setting depends on protocol stack and OS. Consult respective operator’s manual for advice.
- When using a remote router, raising the communications cue (buffer) setting can speed up throughput time. However, in some cases it may be necessary for the ship and land terminals to have the same router. Some routers cannot be used for Inmarsat HSD communications, especially those which cannot accommodate circuits which have large propagation delay. Consult with router maker and dealer to determine suitable router.
- For further details consult the network manager.

Router setting for network connection

Example:

	Type	Manufacturer
Router	CISCO 1601	CISCO SYSTEMS
IOS soft	SFC1601C11.33	CISCO SYSTEMS
Cable	CAB449MT	CISCO SYSTEMS

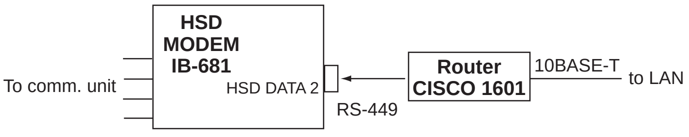


Figure 24Sample of connection

Set subscriber number at the FELCOM *51* ...#

```
cisco1601#sh conf
version 11.3
service udp-small-servers
service tcp-small-servers
!
hostname cisco1601
!
enable password *****
!
username land-term password 0 *****
!
interface Ethernet0
 ip address 192.168.2.1 255.255.255.0
!
interface Serial0
 ip address 192.168.10.10 255.255.255.0
 encapsulation ppp
 no keepalive
 dialer dtr
 dialer-group 1
 ppp authentication chap
!
ip classless
ip route 0.0.0.0 0.0.0.0 192.168.10.1
ip route 192.168.0.0 255.255.255.0 192.168.10.1
ip route 192.168.1.0 255.255.255.0 192.168.10.1
dialer-list 1 protocol ip permit
snmp-server community public R0
!
line con 0
 exec-timeout 0 0
line vty 0 4
 password *****
 login
!
end

cisco1601#
```

This example shows only the minimum necessary settings for confirmation. Further details can be obtained from a Cisco dealer or Cisco’s home page (http://www.cisco.com).

For other router see its operator’s manual.

Network configuration

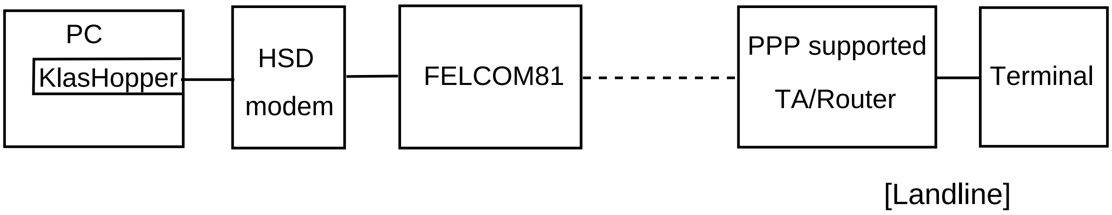
- Network configuration depends on application and number of terminals used. Generally, setup is done on the user’s equipment.
- Setup depends on shipboard network and land network. For details contact the network manager.
- We recommend that identification be exchanged between sender and receiver. Where required used packet filtering and firewall.
- FURUNO will assume no responsibility for security-related problems.

Syuchronous -asynchronous adapter

This section discusses some of the synchronous -asynchronous adapters currently available. Connecting a single PC as in the figures below you can connect to a subscriber much easier than by using a Dial -up Router.

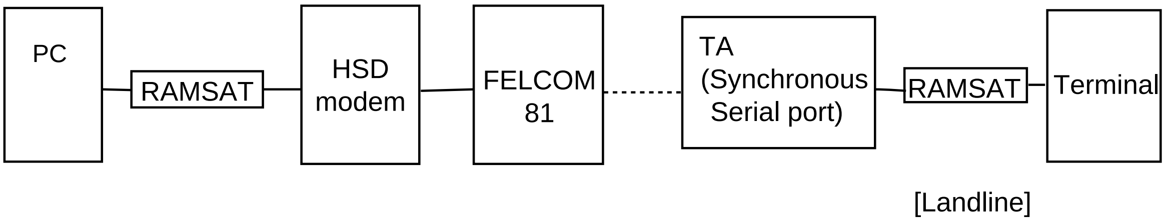
These devices have been tested by FURUNO.

KlasHopper PCMCIA400 (Klas Ltd., Ireland)


PC
KlasHopper
HSD modem
FELCOM81
PPP supported TA/Router
Terminal
[Landline]

- Drive software required to use the equipment.
- PPP (Point-to- Protocol) supported. Therefore, KlasHopper is not required at receiving end. You can connect to an internet service provider with an ordinary modem or terminal adapter.
- No limitations to software usage (Web Browser, E-mail, etc.)

RAMSAT RVH24(ODC-Caltronic A/S, Denmark)


PC
RAMSAT
HSD modem
FELCOM 81
TA (Synchronous Serial port)
RAMSAT
Terminal
[Landline]

- No driver software required. However, modem data files are provided to permit the RAMSAT to function as an external modem.
- RAMSAT required by both sender and receiver .

  NOTE : RAMSAT may introduce a converter which supports PPP. Then, its function may be similar to the KlasHopper.

- File transfer software which provides simultaneous transmission and reception of files is optionally available. However this software has not been tested by FURUNO.

Land Earth Station

	INMARSAT-B LES STATUS TO 31st August 1999			BV - B Voice; BF - B Fax; BT - B Telex, BD - B Data; BHSD - B High Speed Data
OCEAN REGION	LES NAME	LES PROVIDER	LES ACCESS CODE	STATUS
AOR-E	Ausguel	France Telecom	011	BV. BF, BT, BD, BHSD
AOR-E	Beijing Marine at Southbury	Beijing Marine & Navigation	868	BV. BF, BT, BD, BHSD
AOR-E	Burum	PTT Telecom	012	BV. BF, BT, BD, BHSD
AOR-E	Eik	Telenor	004	BV. BF, BT, BD, BHSD
AOR-E	Fucino	Telecom Italia	555	BV. BF, BT, BD, BHSD
AOR-E	Goonhilly	BT	002	BV, BF, BT, BD, BHSD
AOR-E	Hong Kong at Laurentides	HKT	118	BV. BF, BT, BD, BHSD
AOR-E	Indot at Laurentides	Indot	007	BV, BF, BT, BD, BHSD
AOR-E	Jeddah	Ministry of PTT	025	BV, BF, BT, BD, pending RCC info
AOR-E	KDD at Burum	KDD	003	BV. BF, BT, BD, BHSD
AOR-E	Korea Telecom at Laurentides	Korea Telecom	006	BV. BF, BT, BD, BHSD
AOR-E	Laurentides	Stratos Mobile Networks	013	BV. BF, BT, BD, BHSD
AOR-E	Morsviazsputnik at Laurentides	Morsviazsputnik	015	BV. BF, BT, BD, BHSD
AOR-E	Raisting	DeTeMobil	111	BV. BF, BT, BD, BHSD
AOR-E	Singapore Telecom at Ausguel	Singapore Telecom	210	BV. BF, BT, BD, BHSD
AOR-E	Southbury	CMC	001	BV. BF, BT, BD, BHSD
AOR-E	Pry	Telekomunikacja Polska	016	BV, BF, BT, BD, pending results
AOR-E	Telstra at Laurentides	Telstra	222	BV. BF, BT, BD, BHSD
AOR-E	Thermoplyae	OTE	005	BV. BF, BT, BD, BHSD, pending results
AOR-E	VSNL at Southbury	VSNL	306	BV. BF, BT, BD, BHSD
AOR-W	Ausguel	France Telecom	011	BV. BF, BT, BD, BHSD,
AOR-W	Beijing Marine at Southbury	Beijing Marine & Navigation	868	BV. BF, BT, BD, BHSD
AOR-W	Burum	PTT Telecom	012	BV. BF, BT, BD, BHSD,
AOR-W	DeTeMobil at Ausguel	DeTeMobil	111	BV. BF, BT, BD, BHSD
AOR-W	Eik	Telenor	004	BV. BF, BT, BD, BHSD,
AOR-W	Goonhilly	BT	002	BV, BF, BT, BD, BHSD, ,

AOR-W	Hong Kong at Laurentides	HKT	118	BV. BF, BT, BD, BHSD
AOR-W	Indot at Laurentides	Indot	007	BV. BF, BT, BD, BHSD
AOR-W	KDD at Burum	KDD	003	BV. BF, BT, BD, BHSD
AOR-W	Korea Telecom at Laurentides	Korea Telecom	006	BV. BF, BT, BD, BHSD
AOR-W	Laurentides	Stratos Mobile Networks	013	BV. BF, BT, BD, BHSD
AOR-W	Morsviazsputnik at Laurentides	Morsviazsputnik	015	BV. BF, BT, BD, BHSD
AOR-W	OTE at Southbury	OTE	005	BV. BF, BT, BD, BHSD
AOR-W	Singapore Telecom at Ausguel	Singapore Telecom	210	BV. BF, BT, BD, BHSD
AOR-W	Southbury	CMC	001	BV. BF, BT, BD, BHSD
AOR-W	Telecom Italia at Southbury	Telecom Italia	555	BV. BF, BT, BD, BHSD
AOR-W	Telstra at Laurentides	Telstra	222	BV. BF, BT, BD, BHSD
AOR-W	VSNL at Southbury	VSNL	306	BV. BF, BT, BD, BHSD
IOR	Arvi	VSNL	306	BV, BF, BT, BD
IOR	Ausguel	France Telecom	011	BV. BF, BT, BD, BHSD
IOR	Beijing	Beijing Marine & Navigation	868	BV, BF, BT, BD
IOR	British Telecom at EIK	BT	002	BV. BF, BT, BD, BHSD
IOR	Burum	PTT Telecom	012	BV. BF, BT, BD, BHSD,
IOR	Cape d'Aguilar	HKT	118	BV, BF, BT, BD
IOR	Comt Eurasia	CMC	001	BV, BF, BT, BD, BHSD
IOR	Eik	Telenor	004	BV. BF, BT, BD, BHSD
IOR	Fucino	Telecom Italia	555	BV. BF, BT, BD, BHSD
IOR	Jabatan Telekom	Datastream Technology	888	BV, BF, BT
IOR	Jatiluhur	Indot	007	BV, BF, BT, BD
IOR	Jeddah	Ministry of PTT	025	BV, BF, BT, BD, pending RCC info
IOR	Kuantan	Malaysia Telecom	060	BV, BF, BT
IOR	Kumn	Korea Telecom	006	BV, BF, BT, BD, BHSD
IOR	Morsviazsputnik at Perth	Morsviazsputnik	015	BV. BF, BT, BD, BHSD
IOR	Nonthaburi	Thailand	333	BV, BF, BT
IOR	Perth	TELSTRA	222	BV, BF, BT, BD, BHSD,

IOR	Raisting	DeTeMobil	111	BV. BF, BT, BD, BHSD
IOR	Sento	Singapore Telecom	210	BV. BF, BT, BD, BHSD
IOR	Stratot Perth	Stratos Mobile Networks	013	BV. BF, BT, BD, BHSD
IOR	Pry	Telekomunikacja Polska	016	BV, BF, BT, BD, pending results
IOR	Thermoplyae	OTE	005	BV, BF, BT, BD, BHSD, pending results
IOR	Towi Al man	ETILAT	123	BV. BF, BT, BD
IOR	Yamaguchi	KDD	003	BV. BF, BT, BD
POR	Beijing	Beijing Marine & Navigation	868	BV, BF, BD, BT
POR	BT Pacific	BT	002	BV, BF, BD, BT, BHSD
POR	Cape d'Aguilar	HKT	118	BV. BF, BD, BT
POR	DeTeMobil at Perth	DeTeMobil	111	BV, BF, BT, BD, BHSD
POR	France Telecom at Perth	France Telecom	011	BV, BF, BT, BD, BHSD
POR	Indot at Perth	Indot	007	BV, BF, BT, BD, BHSD
POR	Jabatan Telekom	Datastream Technology	888	BV, BF, BT
POR	Kumn	Korea Telecom	006	BV, BF, BT, BD, BHSD,
POR	Malaysia Telecom at Perth	Malaysia Telecom	060	BV, BF, BT, BD, BHSD
POR	Morsviazsputnik at Perth	Morsviazsputnik	015	BV. BF, BT, BD, BHSD
POR	OTE at nta Paula	OTE	005	BV, BF, BT, BD, BHSD
POR	Perth	TELSTRA	222	BV, BF, BT, BD, BHSD
POR	nta Paula	CMC	001	BV, BF, BT, BD, BHSD
POR	Sento	Singapore Telecom	210	BV. BF, BT, BD, BHSD
POR	Stratot Perth	Stratos Mobile Networks	013	BV. BF, BT, BHSD, BD
POR	Station 12 at Yamaguchi	PTT Telecom	012	BV. BF, BT, BD
POR	Telecom Italia at nta Paula	Telecom Italia	555	BV, BF, BT, BD, BHSD
POR	Telenor at BT Pacific	Telenor	004	BV, BF, BD, BT, BHSD
POR	VSNL at nta Paula	VSNL	306	BV, BF, BT, BD, BHSD
POR	Yamaguchi	KDD	003	BV, BF, BT, BD,

SPECIFICATIONS OF HSD MODEM UNIT
IB-681

1. GENERAL

(1) Tx Frequency	179.8 MHz
(2) Rx Frequency	90.0 MHz
(3) Channel Frequency Spacing	100 kHz
(4) Receive Level	-60 dBm to -90 dBm
(5) Transmit Level	-12.5 dBm
(6) Channel Rate	132 Kbps
(7) Modulation	O-QPSK, 50% filtered
(8) Data Speed	56/64 Kbps, synchronous
(9) Interface	RS-232C (Dsub25p), RS-449 (Dsub37p)

2. POWER SOURCE

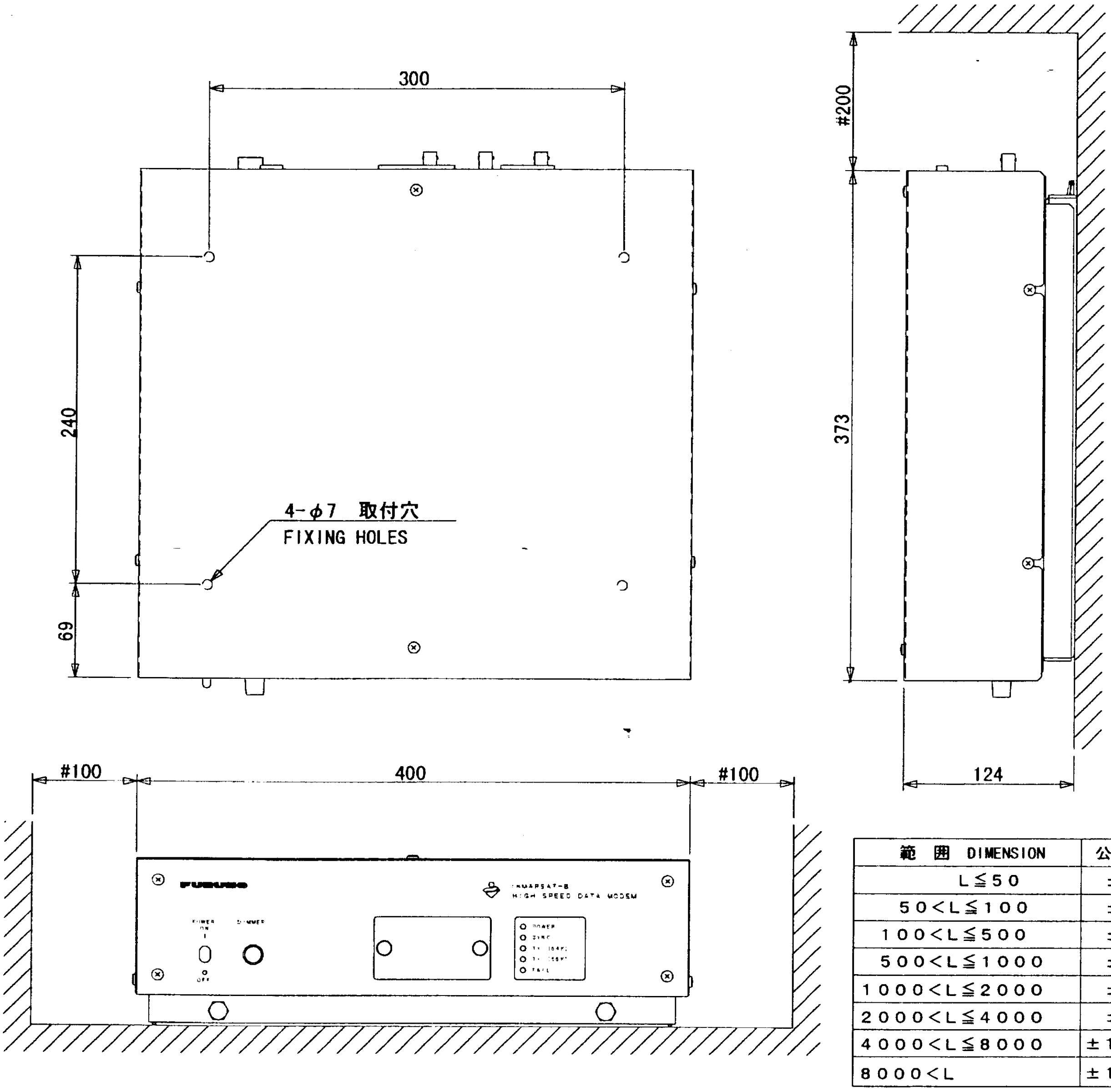
(1) Rated Power	100/220 VAC (±10%): 0.3/0.2 A, 1 Phase, 50/60 Hz

3. ENVIRONMENTAL CONDITION

(1) Temperature	-15 °C to +55 °C
(2) Relative Humidity	93% at +40 °C
(3) Water Resistance	IPX2

4. COATING COLOR

(1) Cover	2.5GY5/1.5 Newtone No.5
(2) Panel	N3.0


300
240
69
4-φ7 取付穴
FIXING HOLES
#200
373
124
#100
400
#100
INMARSAT-B
HIGH SPEED DATA MODEM
POWER
ON
I
OFF
DIMMER
POWER
SYNC
TX (64K)
TX (56K)
FAIL

範囲 DIMENSION	公差 TOL.
L≦50	±1mm
50<L≦100	±2mm
100<L≦500	±3mm
500<L≦1000	±4mm
1000<L≦2000	±5mm
2000<L≦4000	±7mm
4000<L≦8000	±10mm
8000<L	±15mm

表1 TABLE 1

注記

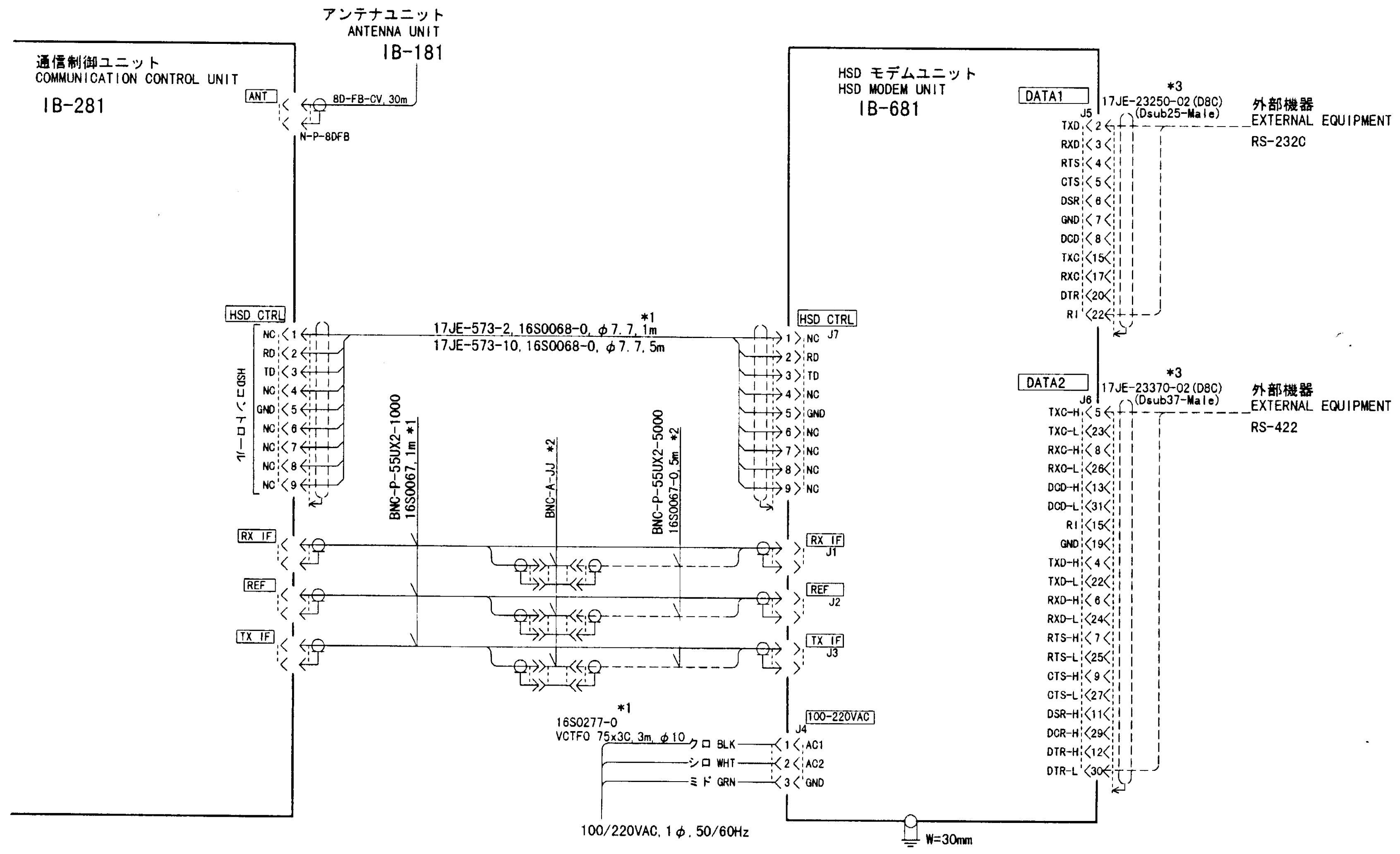
1）装備ケーブルはサービス時、本体を前方に充分引き出せるよう余裕を持たせること。
2）取付用ネジはM6ボルトまたはトラスタッピングネジ呼び6X20を使用のこと。
3）#印寸法は最小サービス空間寸法とする。
4）指定外の寸法公差は、表1による。
5）装備ケーブルの端末処理は装備要領書参照のこと。

NOTE

1. KEEP ENOUGH CABLE LENGTH BEHIND UNIT.
2. USE M6 BOLTS OR TAPPING SCREWS φ6 FOR FIXING UNIT.
3. #: RECOMMENDED SERVICE CLEARANCE.
4. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
5. REFER TO INSTALLATION INSTRUCTIONS FOR FABRICATION OF CABLE ENDS.

DRAWN	July 9 '99 T.YAMASAKI		TITLE	IB-681
CHECKED	July 9 '99 K.Kusunoki		名称	HSDモデムユニット
APPROVED	July 9 '99 K.Kusunoki	FELCOM 81		外寸図
SCALE	1/5 MASS 12 kg		NAME	HSD MODEM UNIT
DWG. No.	C5609-G08- B	16-011-6000- G5		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.


アンテナユニット
ANTENNA UNIT
IB-181
通信制御ユニット
COMMUNICATION CONTROL UNIT
IB-281
ANT
8D-FB-CV, 30m
N-P-8DFB
HSD CTRL
HSDコントロール
NC 1
RD 2
TD 3
NC 4
GND 5
NC 6
NC 7
NC 8
NC 9
RX IF
REF
TX IF
*1
17JE-573-2, 16S0068-0, φ7.7, 1m
17JE-573-10, 16S0068-0, φ7.7, 5m
BNC-P-55UX2-1000
16S0067, 1m *1
BNC-A-JJ *2
BNC-P-55UX2-5000
16S0067-0, 5m *2
*1
16S0277-0
VCTFO 75x3C, 3m, φ10
クロ BLK
シロ WHT
ミドリ GRN
100/220VAC, 1φ, 50/60Hz
HSD モデムユニット
HSD MODEM UNIT
IB-681
HSD CTRL J7
1 NC
2 RD
3 TD
4 NC
5 GND
6 NC
7 NC
8 NC
9 NC
RX IF J1
REF J2
TX IF J3
100-220VAC J4
1 AC1
2 AC2
3 GND
W=30mm
DATA1 J5
TXD 2
RXD 3
RTS 4
CTS 5
DSR 6
GND 7
DCD 8
TXC 15
RXC 17
DTR 20
RI 22
*3
17JE-23250-02(D8C)
(Dsub25-Male)
外部機器
EXTERNAL EQUIPMENT
RS-232C
DATA2 J6
TXC-H 5
TXC-L 23
RXC-H 8
RXC-L 26
DCD-H 13
DCD-L 31
RI 15
GND 19
TXD-H 4
TXD-L 22
RXD-H 6
RXD-L 24
RTS-H 7
RTS-L 25
CTS-H 9
CTS-L 27
DSR-H 11
DCR-H 29
DTR-H 12
DTR-L 30
*3
17JE-23370-02(D8C)
(Dsub37-Male)
外部機器
EXTERNAL EQUIPMENT
RS-422

注記

*1）コネクタは工場にて取付済み。

*2）オプション

*3）コネクタは支給。

NOTE

*1. CONNECTORS FITTED AT FACTORY.

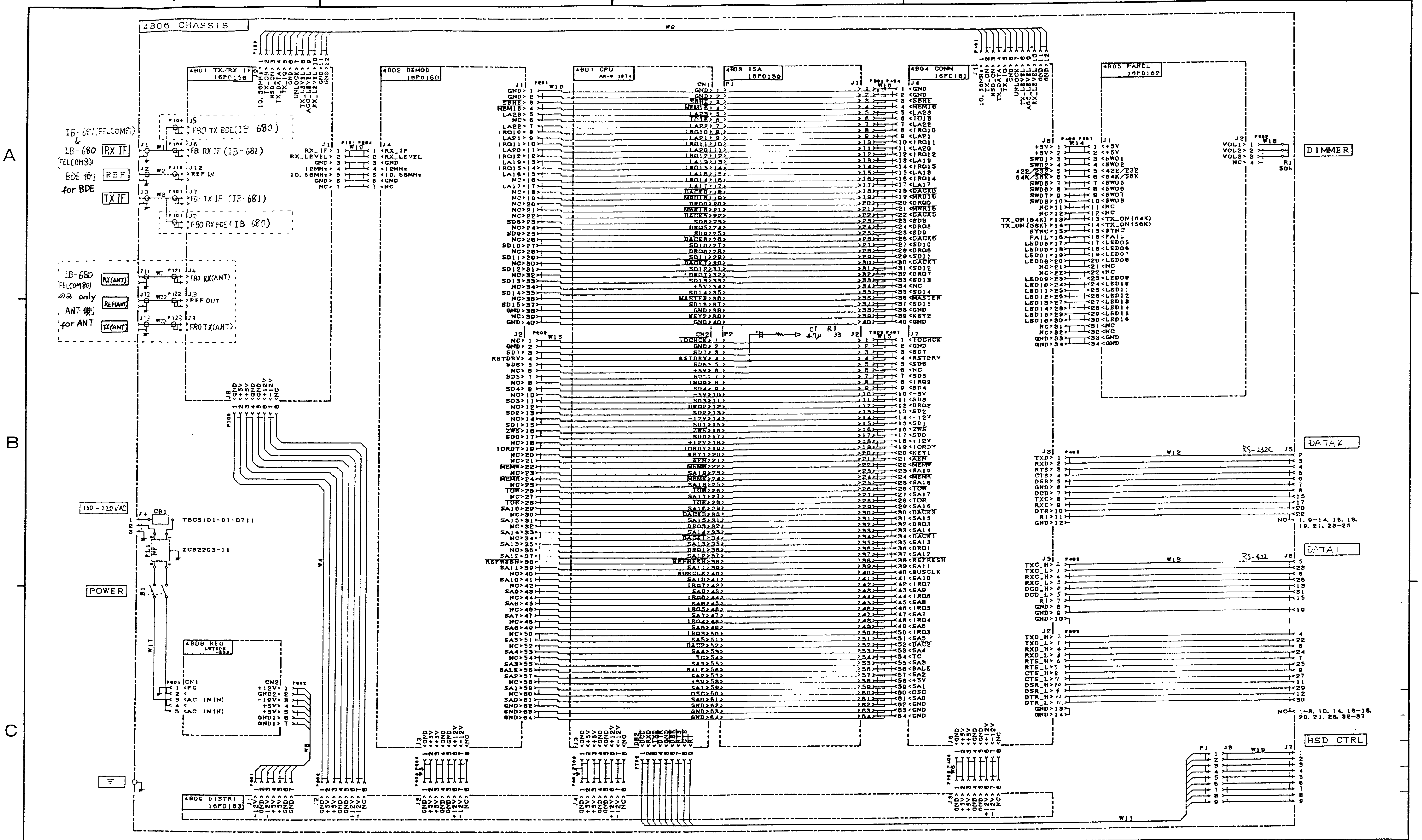
*2. OPTION

*3. CONNECTOR SUPPLIED.

DRAWN Jan 18 '99 T.YAMASAKI		TITLE	IB-681
CHECKED Jan 18 '99 K.Kusunoki		名称	HSDモデムユニット
APPROVED Jan 18 '99 K.Kusunoki	FELCOM81		相互結線図
SCALE	MASS kg	NAME	HSD MODEM UNIT
DWG. No. C5609-C03- A			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO


1
2
3
4
A
B
C
4B06 CHASSIS
W9
4B01 TX/RX IF 16P0158
4B02 DEMOD 16P0160
4B07 CPU
4B03 ISA 16P0159
4B04 COMM 16P0161
4B05 PANEL 16P0162
4B08 REG
4B09 DISTRI 16P0163
IB-681(FELCOM81) & IB-680 (FELCOM80) BDE側 for BDE
RX IF
REF
TX IF
F90 TX BDE (IB-680)
F81 RX IF (IB-681)
REF IN
F81 TX IF (IB-681)
F80 RX BDE (IB-680)
IB-680 (FELCOM80) のみ only ANT側 for ANT
RX(ANT)
REF(ANT)
TX(ANT)
F80 RX(ANT)
REF OUT
F80 TX(ANT)
100 - 220VAC
CB1
TBC5101-01-0711
ZCB2203-11
POWER
AC IN(N)
AC IN(H)
C1 4.7μ
R1 33
DIMMER
R1 50k
DATA 2
RS-232C
W12
DATA 1
RS-422
W13
HSD CTRL
W19
W11

注記 1）点線で囲った部分は、FELCOM 80 のときのみ

Note 1. Broken line areas show parts for FELCOM 80.

DRAWN Jan 14 '99 T.Yamasaki
CHECKED Jan 14 '99 K.Kusunoki
APPROVED Jan 14 '99 K.Kusunoki
SCALE /
MASS kg
DWG NO. C5609-K30- C

FELCOM80
FELCOM81
APPLICABLE TO: (MODEL)
BLOCK NO.
16-001-2035- 2

TYPE IB-680/681
名称 HSDユニット
回路図
NAME HSD UNIT
SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

INDEX

A

Address call 7, 13
Automatic call 15
Automatic call mode 3
Automatic data rate switching 4
Automatic HSD call 7

B

Breaker 2
BSC format 4

C

Character format 4
Command format 4
CRN 10

D

Data rate 3
DIC 9
DIMMER control 1
DIP switches 3
Direct call 7, 12
DTE 7
DTR 7, 9

H

HDLC format 4
HSD CTRL 2
HSD DATA 1 2
HSD DATA 2 2

M

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P

POWER switch 1
Progress tones 8

R

receiving 9
REF 2
RI 9
RS-232 .... 2, 4, 20
RS-449 .... 2, 4, 21
RX IF 2

S

Status LEDs 1
Switch panel 3

T

Terminal interface 4
TX IF 2

V

V.25bis 10

FURUNO ELECTRIC CO., LTD.
9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan
Tel: +81 798-65-2111 Fax: +81 798-65-4200

Pub NO. DOC-230

Declaration of conformity to type

We FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

hereby declare under our sole responsibility that the product

Inmarsat-B satellite earth station HSD Modem models IB-680 for Felcom 80A/80B and IB-681 for Felcom 81A/81B

(Model names, type numbers)

to which this declaration relates conforms to the following standard(s) or normative document(s)

EN 60945: January 1997 (IEC 60945 Third edition: 1996-11)

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see EC type-examination certificate N° KCS/99212003/AA/00 of 2 June 1999 issued by KCS Certification, The Netherlands

This declaration is issued according to the provisions of European Council Directive 96/98/EC on marine equipment modified by Commission Directive 98/85/EC.

On behalf of Furuno Electric Co., Ltd.

Hiroaki Komatsu
Manager,
International Rules and Regulations

(name and signature or equivalent marking of authorized person)

Nishinomiya City, Japan
June 16, 1999

(Place and date of issue)